

AUSTRALIAN COWRIES.

By TOM IREDALE.

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(Plates viii. & ix.)

Since the earliest times Cowries have been the most popular of all shells on account of their beauty of coloration and form, the extraordinary polish calling attention to their varied patterns. However to the worker, fortunate enough to see them in the living state, the greater variety and elegance of the animals have appealed even more. Unfortunately, however, the animals are very shy and withdraw themselves into their shells, and do not easily thereafter expand themselves so that they can be examined at leisure.

Mr. Melbourne Ward, the well-known carcinologist, now living at Lindeman Island, was so attracted by these molluscs that he placed them in his aquarium, and by intensive study found that they would come out and walk about at night. He made some paintings and sent them to me, and upon my request has continued his interest and has made paintings of no less than twenty species. In each case with the painting he sent the shell itself from the animal of which the painting had been made, thus fixing absolutely the identity for all time of the species figured. For the purposes of reproduction, Miss Joyce Allan, of the Australian Museum, has copied Mr. Ward's paintings, and alongside has painted the shell from the dorsal and ventral surface, and these are now presented as a first contribution to the exact study of the animals of Cowries in Australia. Just one hundred years ago a similar series of paintings of Indo-Pacific Cowries and animals was published in the Zoology of the Voyage of the Astrolabe by Quoy and Gaimard, and these paintings have been copied in very many places ever since. Garrett, the great conchologist, who worked among the islands of the Pacific Ocean, has given descriptions of some animals, but no figures, and Mrs. Coxen published three descriptions made by her husband of common Moreton Bay animals. Angas gave a couple of notes of South Australian forms, but otherwise there seems to be very little on record. In order to assist in the further study of this delightful group, a list of Australian Cowries and their allies has been drawn up, and Quoy and Gaimard's, Garrett's and Mrs. Coxen's descriptions given. Mr. Melbourne Ward will continue his studies, and it is hoped that the present essay will induce everyone who has the good fortune to meet with these animals to take colour notes and make drawings or paintings if possible. If these be transmitted to the Australian Museum, it may be possible later to continue with a further account of the animals of Australian Cowries. In each case it will be necessary to preserve the exact shell of the animal observed, described or painted.

Conchologically, Cowries have been well monographed and illustrated in colour, Sowerby, Reeve, Weinkauff and Roberts, in Tryon's Manual, each furnishing excellent figures. More recently, Melvill, Hidalgo, Shaw and now Schilder have reviewed the group in detail, but without illustrations. Consequently, as far as the shells are concerned, a great deal has been done with them, but Mr. Ward's investigations in connection with the animals have opened up a new field, as some of the species which apparently from shell characters ran into each other are shown to cover very different animals. Schilder's series of papers since 1922 have been utilised

in the preparation of this list, which is a compilation of all the records available in conjunction with personal study in the field of Queensland and New South Wales species, the Australian Museum collection being very representative in this group.

The list herewith covers the superfamily Cypraeoidea, including the families Eratoidae, Triviidae, Pediculariidae, Amphiperatidae, Umbilicidae and Cypraeidae. All the Australian members are listed, and this will serve as a basis for further conchological research, as well as additional malacological information.

Superfamily CYPRAEOIDEA.

This agrees with the Stirps Cypraeacea of Thiele.

Family ERATOIDAE.

Although the animals of these small shells have been seen, no notes nor sketches have yet been taken.

Genus ERATOENA nov.

Type, *Ovulum corrugatum* Hinds.

The small sculptured species are very distinct from the larger smooth forms of *Lachryma*, and, as they are seen to be represented in the fossil state as *Eratopsis* from the Miocene of Austria, the tropical recent species are here separated. The nodulation makes the species easily recognisable, but when this is subobsolete the apertural characters distinguish them. There are three or more species in Australian waters, but these will be later more fully reported upon.

ERATOENA CORRUGATA Hinds.

1845. *Ovulum corrugatum* Hinds, Zool. Voy. Sulphur, Moll., p. 47, pl. xvi., figs. 5, 6. New Guinea. Queensland.

Smith (Proc. Mal. Soc. (Lond.), Vol. ix., p. 19, March, 1910), lumped this with *E. schmeltziana* Crosse (Journ. de Conch., Vol. xv., p. 301, pl. xi., fig. 5, July 1, 1867; Fiji Islands), under *E. sulcifera* Sowerby (Conch. Illus., pt. 8, fig. 46, ex Gray M.S.; November 16, 1832; Cape of Good Hope), a different species.

ERATOENA NANA Reeve.

1865. *Erato nana* Reeve, Conch. Icon., Vol. xv., pl. iii., sp. and fig. 18, ex Duclos MS. March. Locality unknown. Queensland.

This is included in the Queensland list, but there may be more than one very small species, and perhaps *Erato gemma* Bavay (Journ. de Conch., Vol. lxiii., p. 108, pl. iii., figs. 1, 2, August 31, 1917) may be recognised later here as many Lifu shells occur on the Great Barrier Reef.

Genus LACHRYMA.

1832. *Lachryma* Sowerby, Conch. Illus., pt. 8, Cat., p. 15, November 16. ex Humphrey MS. Haplotype, *Erato lachryma* Sowerby.

The smooth forms may even be later separated, as there is a series of fossils in Southern Australia which show distinctive features, and the southern recent species may be descendants from this source, and thus not congeneric with the tropical shells.

LACHRYMA LACHRYMA Sowerby.

1832. *Erato lachryma* Sowerby, Conch. Illus., pt. 7, fig. 48. November 9. ex Gray MS. Catal., p. 15, pt. 8. November 16. New South Wales.

1832. *Lachryma trifasciata* Sowerby, Conch. Illus., pt. 8, Catal., p. 15. Nov. 16. ex Humphrey MS. As synonym. New South Wales. Queensland.

LACHRYMA DENTICULATA Pritchard & Gatliff.

1900. *Erato denticulata* Pritchard & Gatliff, Proc. Roy. Soc. Vict., Vol. xiii. (n.s.), p. 133, pl. xx., fig. 5. August. (ex Vol. xii. (n.s.), p. 188, April, 1900, *nomen nudum*.) Western Port, Victoria. Victoria. Tasmania. South Australia. West Australia.

This has been confused with the preceding, but the characters cited by the authors are valid and allow its separation.

LACHRYMA (CYPRAERATO) BIMACULATA Tate.

1878. *Erato bimaculata* Tate, Trans. Roy. Soc. South Austr., Vol. i., p. 88 (? December). Aldinga, St. Vincent's Gulf, South Australia.
1901. *Erato bimaculata* Tate & May, Proc. Linn. Soc. N.S.W., Vol. xxvi., p. 375, pl. xxiii., fig. 6. South Australia. Tasmania (?). West Australia.

LACHRYMA (CYPRAERATO) GALLINACEA Hinds.

1844. *Ovulum gallinaceum* Hinds, Zool. Voy. Sulphur. Moll., p. 47, pl. xvi., figs. 1, 2. New Guinea. Queensland.

LACHRYMA (CYPRAERATO) ANGISTOMA Sowerby.

1832. *Erato angistoma* Sowerby, Conch. Illus., pt. 8, fig. 51. November 16. Catal., p. 16, pt. 8. November 16. East Indies. Queensland.

LACHRYMA (CYPRAERATO) BISINVENTA Iredale.

1931. *Lachryma bisinventa* Iredale, Rec. Austr. Mus., Vol. xviii., p. 223, pl. xxii., fig. 16. June 29. Sydney Harbour, N.S.W. New South Wales.

Family TRIVIIDAE.

Probably as great distinction will be found among the animals of the shells referred to this family as among those of the Cowries proper. The few figures show discrepancies, and the animals seen, but of which we have no paintings yet, differed at sight.

Genus TRIVIROSTRA.

1884. *Trivirostra* Jousseaume, Le Naturaliste, 6th year, p. 415. February 15. Logotype, Roberts, Man. Conch. (Tryon), Vol. vii., p. 161. July 3, 1885. *Cypraea scabriuscula* Gray.

TRIVIROSTRA SCABRIUSCULA Gray.

1827. *Cypraea scabriuscula* Gray, Zool. Journ., Vol. iii., p. 364. December 31. Madagascar. New South Wales.

TRIVIROSTRA ORYZA Lamarck.

1810. *Cypraea oryza* Lamarck, Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 104. After August. Asiatic Ocean. Queensland.

TRIVIROSTRA EDGARI Shaw.

1909. *Trivia edgari* Shaw, Proc. Mal. Soc. (Lond.), Vol. viii., p. 310. July. New name for

1849. *Cypraea grando* Gaskoin, Proc. Zool. Soc. (Lond.), 1848, p. 96. March 13, 1849. Manilla. Not *C. grando* Potiez & Michaud, Gal. Moll. Douai, October, 1838, i., p. 481.
Queensland.

TRIVIROSTRA GASKOINII Roberts.

1869. *Trivia gaskoinii* Roberts, Amer. Journ. Conch., Vol. v., Cat. Porcell., p. 206. New name for
1849. *Cypraea sulcata* Gaskoin, Proc. Zool. Soc. (Lond.), 1848, p. 95. March 13, 1849. Manilla. Not *C. sulcata* Dillwyn, Descr. Cat. Rec. Shells, p. 466, 1817.
Queensland.

TRIVIROSTRA ORYZOIDEA nom. nov.

1917. *Trivia oryza* Odhner, Kungl. Sv. Vet. Akad. Handl. Bd., 52, No. 16, p. 53, pl. 2, figs. 52, 53, text fig. 12. September 19. 45 miles. W.S.W. of Cape Jaubert, North West Australia, 11 fathoms. Not *Cypraea oryza* Lamarck, above.
North West Australia.

TRIVIROSTRA VITREA Gaskoin.

1849. *Cypraea vitrea* Gaskoin, Proc. Zool. Soc. (Lond.), 1848, p. 95. March 13, 1849. Philippines.
Queensland.

TRIVIROSTRA PARGRANDO nom. nov.

1917. *Trivia grando* Odhner, Kungl. Sv. Vet. Akad. Handl. Bd., 52, No. 16, p. 53, pl. 2, figs. 50, 51, text fig. 11. September 19. 42 miles W.S.W. of Cape Jaubert. N.W.A., 11 fathoms. Not *T. edgari* Shaw, above.
North West Australia.

Genus DOLICHUPIS.

1930. *Dolichupis* Iredale, Mem. Queensland Mus., Vol. x., p. 83. August 28. Orthotype, *Cypraea producta* Gaskoin.

DOLICHUPIS PRODUCTA Gaskoin.

1836. *Cypraea producta* Gaskoin, Proc. Zool. Soc. (Lond.), 1835, p. 200. April 8, 1836. No locality.
Queensland.

DOLICHUPIS OBSCURA Gaskoin.

1849. *Cypraea obscura* Gaskoin, Proc. Zool. Soc. (Lond.), 1848, p. 94. March 13, 1849. North West Australia. Dupuch's Island (Dring), Abrolhos Island (Dring).
1917. *Trivia bipunctata* Odhner, Kungl. Sv. Vet. Akad. Handl. Bd., 52, No. 16, p. 53, pl. ii, figs. 54, 55, text fig. 10. September 19. 42 miles W.S.W. of Cape Jaubert, North West Australia, 11 fathoms.
North West Australia.

When Gaskoin published his description, he stated that apparently it had already been described by Kiener under the name *C. napolina* Duclos, but that "Kiener's figures, pl. 53, figs. 3 and 3a, are no representations of his descriptions." Kiener's species belongs to West Africa, and is certainly not the West Australian shell.

DOLICHUPIS PELLUCIDULA Reeve.

1846. *Cypraea pellucidula* Reeve, Conch. Icon., Vol. iii., pl. xxvi., fig. 153. ex Gaskoin MS. March. South Pacific.

1846. *Cypraea pellucidula* Gaskoin, Proc. Zool. Soc. (Lond.), 1846, p. 23.
May. South Pacific.
Queensland.

DOLICHUPIS INSECTA Mighels.

1845. *Cypraea insecta* Mighels, Proc. Boston Soc. Nat. Hist., Vol. ii., p. 24.
January. Oahu, Hawaiian Group.
New South Wales.

Genus CLEOTRIVIA.

1930. *Cleotrivia* Iredale, Mem. Queensland Mus., Vol. x., p. 83. August 28.
Orthotype, *Cypraea pilula* Kiener.

CLEOTRIVIA PILULA Kiener.

1845. *Cypraea pilula* Kiener, Species General, Genus *Cypraea*, p. 151, pl. liv., figs. 2, 2a (1843). No locality.
Queensland. New South Wales.

Cypraea globosa Sowerby (Conch. Illus. pt. 6, fig. 34, November 2, 1832, ex Gray MS. No locality) is now regarded as an American species, but there are two or three small globose species in Queensland, and these will be worked out later.

CLEOTRIVIA BATHYPILULA nom. nov.

1918. *Trivia globosa* Verco, Trans. Roy. Soc. South Austr., Vol. xlii., p. 150.
40-80 miles west of Eucla, West Australia. 72-81 fathoms. South West Australia.

This deepwater shell is narrower and less elevated than the so-called *pilula* of the east coast, and, of course, it cannot be called *globosa* in any sense. The measurements are: Length, 4 mm.; breadth, 3 mm.; height, 2.5 mm. It will be figured later.

Genus ELLATRIVIA.

1931. *Ellatrivia* Iredale, Rec. Austr. Mus., Vol. xviii., p. 221. June 29.
Orthotype, *Triviella merces* Iredale.

ELLATRIVIA MERCES Iredale.

1924. *Triviella merces* Iredale, Proc. Linn. Soc. N.S.W., Vol. xlix., p. 257, pl. xxxv., figs. 16-17. October 24. New South Wales.

1822. *Cypraea australis* Lamarck, Hist. Anim. s. Vert., Vol. vii., p. 404.
August. New Holland (Macleay). Not *C. australis* Schroeter,
Arch. Zool. (Wied.), Vol. iv., p. 10, 1804.

New South Wales. Victoria. Tasmania. South Australia. South West Australia.

ELLATRIVIA (MERCES) ADDENDA Iredale.

1931. *Ellatrivia (merces) addenda* Iredale, Rec. Austr. Mus., Vol. xviii., p. 221. June 29. Off Montague Island. New South Wales. 50-70 fathoms.

New South Wales (deep water).

The animal of *Cypraea australis* Lamarck was illustrated by Quoy and Gaimard, and Miss Allan has made a painting of a local animal which will be reproduced later.

Genus FOSSATRIVIA.

1931. *Fossatrivia* Iredale, Rec. Austr. Mus., Vol. xviii., p. 222. June 29.
Orthotype, *Trivia caelatura* Hedley.

FOSSTRIVIA CAELATURA Hedley.

1918. *Trivia caelatura* Hedley, Journ. Proc. Roy. Soc. N.S.W., Vol. li., Suppl. p. M71. June 19. New name for
1907. *Trivia avellanoides* Hedley, Rec. Austr. Mus., Vol. vi., p. 293, pl. 55, figs. 17-18. January 23. 80 fathoms, off Narrabeen, N.S.W. (Not *C. avellanoides* McCoy, Ann. Mag. Nat. Hist., Ser. iii., Vol. xx., p. 436, 1867.)
New South Wales.

Genus TRIVELLONA.

1931. *Trivellona* Iredale, Rec. Austr. Mus., Vol. xviii., p. 221. June 29. Orthotype, *T. excelsa* Iredale.

TRIVELLONA EXCELSA Iredale.

1931. *Trivellona excelsa* Iredale, Rec. Austr. Mus., Vol. xviii., p. 221, pl. xxiv., figs. 13, 14. June 29. Off Montague Island, N.S.W., 50-70 fathoms.
New South Wales.

Family PEDICULARIIDAE.

This family may be the product of degeneracy from a Volvid form like *Phenacovolva* or *Pellasimnia*, and consequently the animals will differ in various parts of the world, as indicated by Thiele, who had proposed *Pediculariella* for a Californian species. Schilder has placed our local shell under this, but superficially the local species differs.

Genus PEDICULARIONA nov.

Type, *Pedicularia stylasteris* Hedley.

PEDICULARIONA STYLASTERIS Hedley.

1903. *Pedicularia stylasteris* Hedley, Austr. Mus. Mem., iv., p. 342, figs. 69, 70. October 8. Off Wollongong, New South Wales, 55-66 fathoms.
New South Wales.

The elevated sculptured spire, later buried in the shell, separates this distinctly, and there are representatives of this family in Queensland.

Family AMPHIPERATIDAE.

This family can easily be separated into two subfamilies, those with elongate shells living among the branches of corals, and those with rounded shells, some of which live among soft corals. The subfamily Amphiperatinae covers the latter, the well known *Amphiperas* (*Ovula olim*) *ovum*, being a characteristic species, while the equally well known *Volva* (*Radius olim*) *volva* illustrates the lengthened series.

Subfamily AMPHIPERATINAE.

Genus AMPHIPERAS.

1781. *Amphiperas* Meuschen, Index Zoophyl. Gronov., for p. 293. Logotype, Herrmannsen, Index Gen. Malac., p. 41, 1846. *Bulla ovum* Linné.
1789. *Ovula* Bruguiere, Ency. Meth., Vers., Vol. i., p. xv. Logotype, Anton, Verz. Conch., p. 98, 1839 = 1838 (Oct.) as of Lamarck. *Bulla ovum* Linné.

A second species, known as *tortilis* Martyn, but now to be called *costellata* Lamarck, differs in the animal features, and also in the formation of the posterior canal, and is here made the type of a new subgenus, *Parlicium*.

AMPHIPERAS OVUM Linné.

1758. *Bulla ovum* Linné, Syst. Nat., x., ed., p. 725. January 1. First reference, Bonan. recr. 2, t., 252; the second, "Rumph. mus. t. 38, f.Q. Ovum." O. Asiatico. Restricted type locality, definitely, Amboina.
Queensland. New South Wales.

The animal of this pure white shell is black, and has been well figured by Quoy and Gaimard from New Guinea. Their description reads: "The mantle is a beautiful velvety black, covered with little white papillae, simple and little elevated; it is yellowish within. The tentacles are very long, rather thin, white only at the extremity, and black all the rest of their extent. The siphon is short, wide, without fringing."

AMPHIPERAS (PARLICIUM) COSTELLATA Lamarck.

1810. *Ovula costellata* Lamarck, Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 110. After October. L'océan des Grandes Indes? = Friendly Isles.
[1786. *Cypraea tortilis* Martyn, Univ. Conch., pt. ii., pl. 60. Friendly Isles. Rejected as non-binomial.]
Queensland.

All the early localities are the Friendly Islands, and thence Quoy and Gaimard described and figured the animal as follows:—"Has the foot very large, subtriangular, much enlarged in front without being auriculate, of a very beautiful white with a wavy border, marked with a line of pure black, and before and above the front edge it is striated with doubled rosy lines. The tentacles are long, pointed, white with two rose bands. The eyes are placed towards their bases, on a peduncle a little more projecting than in other Cowries. The mantle, of a beautiful yellow orpin, is covered with red brown specks, placed very closely. Its tubercles are a little raised, conical, yellowish, darker yellow at their points."

GENUS CALPURNUS.

1810. *Calpurnus* Montfort, Conch. Syst., pt. ii., pp. 638-9. May. Orthotype, *Bulla verrucosa* Linné.
1840. *Cypraella* Swainson, Treat. Malac., p. 325. May. Haplotype, *Bulla verrucosa* Linné.

CALPURNUS VERRUCOSUS Linné.

(Plate viii., figs. 4, a-b.)

1758. *Bulla verrucosa* Linné, Syst. Nat., x. ed., p. 726. January 1. First reference, Rumph. mus. t. 38, fig. 11. "In India, orientali"; therefore restricted type locality is Amboina.
Queensland.

Mr. Melbourne Ward's painting reproduced here speaks for itself. Quoy and Gaimard described and figured a specimen from Tonga Tabu which agrees very closely, but A. Adams has given a figure, unfortunately without locality, in which the mantle shows large black spots like those on the foot. Attention is drawn to this, as the shell shows very little variation in size or form.

GENUS PROCALPURNUS.

1929. *Procalpurnus* Thiele, Handb. Syst. Weicht., 1st teil., p. 272. Haplotype, *Ovula lactea* Lamarck.

PROCALPURNUS LACTEUS Lamarck.

(Plate viii., figs. 3, a, b, c.)

1810. *Ovula lactea* Lamarck, Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 111.
After October. Timor.
Queensland.

This is an addition to the Australian fauna as though Hedley had collected one dead shell at Murray Island, and Whitley and I got four more at Michaelmas Cay, it had not been recorded when Mr. Melbourne Ward sent down the painting and shell from a living animal from Lindeman Island, and this appears to be the first representation of the animal. Mr. Ward's notes read: "Foot pale green, covered with minute black spots. Mantle dark greenish brown, with faint dark blotches. Papillae very minute. Siphon same colour as foot. Tentacles with red band." The lack of the tubercles at the extremities easily distinguish the shell from that of *Calpurnus*.

Genus MARGOVULA nov.

Type, *Ovulum pyriforme* Sowerby.

This group is easily separated from either *Diminovula* or *Prionovolva* by its shape and the columellar features.

MARGOVULA PYRIFORMIS Sowerby.

1828. *Ovulum pyriforme* Sowerby, Zool. Journ., Vol. iv., pp. 148, 151. Oct.
"New South Wales" = Queensland.
Queensland.

Genus DIMINOVULA.

1930. *Diminovula* Iredale, Mem. Queensland Mus., Vol. x., p. 85. August
28. Haplotype, *D. verepunctata* Iredale.

DIMINOVULA VEREPUNCTATA Iredale.

1930. *Diminovula verepunctata* Iredale, Mem. Queensland Mus., Vol. x., p.
85. August 28. Queensland = Caloundra.
Queensland. New South Wales.

DIMINOVULA CAVANAGHI Iredale.

1931. *Diminovula cavanaghi* Iredale, Rec. Austr. Mus., Vol. xviii., p. 222,
pl. xxii., figs. 13, 14. June 29. Sydney Harbour, New South Wales.
New South Wales. Queensland.

Genus PRIONOVOLVA.

1930. *Prionovolva* Iredale, Mem. Queensland Mus., Vol. x., p. 85. August
28. Haplotype, *Ovulum breve* Sowerby.

PRIONOVOLVA BREVIS Sowerby.

1828. *Ovulum breve* Sowerby, Zool. Journ., Vol. iv., pp. 145, 152. October.
Locality unknown = Queensland.
Queensland. New South Wales.

Subfamily VOLVINAÆ.

The members of this family range from fairly large to very small, and there appears to be many more species in nature than commonly recognised, probably half a dozen yet undescribed from Queensland alone.

Genus VOLVA.

1798. *Volva* Bolten, Mus. Bolten, pt. ii., p. 21. September. Tautotype,
V. textoria = *Bulla volva* Gmelin = Linné.

1810. *Radius* Montfort, Conch. Syst., pt. ii., pp. 626/7. May. Orthotype, *Bulla volva* Linné.

1840. *Birostra* Swainson, Treat. Malac., p. 325. May. Haploptype, *Bulla volva* Linné.

VOLVA VOLVA Linné.

1758. *Bulla volva* Linné, Syst. Nat., xth ed., p. 725. January 1. For List. Conch., 4, figs. 9, c.9, t.1, fig. 1 and Argenv. Conch., t. 21, fig. I. Jamaica error = Ceylon.

1798. *Volva textoria* Bolten, Mus. Bolten, pt. ii., p. 22. September. For Martini, I., t. 23, fig. 218. Knorr., Verg., 5, t. 1, figs. 2, 3, 6; t. 32, fig. 1. No locality = Ceylon.

Queensland. West Australia.

The animal has been figured by A. Adams, but this figure is not like the animal of the Queensland shell, as far as can be recognised from a spirit specimen collected by the Low Isles Expedition, which will be reported upon later.

VOLVA VOLVA CUMULATA Iredale.

1931. *Volva volva cumulata* Iredale, Rec. Austr. Mus., Vol. xviii., p. 222. June 29. New South Wales.

New South Wales.

The southern form is notably broader than the northern one.

Genus PHENACOVOLVA.

1930. *Phenacovolva* Iredale, Mem. Queensland Mus., Vol. x., p. 85. August 28. Orthotype, *P. nectarea* Iredale.

PHENACOVOLVA NECTAREA Iredale.

1930. *Phenacovolva nectarea* Iredale, Mem. Queensland Mus., Vol. x., p. 85, pl. ix., fig. 6. August 28. Port Curtis, Queensland. Queensland. New South Wales.

PHENACOVOLVA HAYNESI Sowerby.

1889. *Ovulum (Birostra) haynesi* Sowerby, Journ. Linn. Soc. (Lond.), Zool., Vol. xx., p. 397, pl. 25, figs. 1, 2. December 31. Exmouth Gulf, North West Australia. North West Australia.

PHENACOVOLVA PRAENOMINATA nom. nov.

1927. *Radius gracillimus* Schilder, Archiv. für Naturg. (Wieg.), 91st Yr. Abt. A., heft 10, p. 79. North West Australia. (Not *R. gracillimus* Smith, Journ. Conch., Vol. x., p. 107, 1901.) North West Australia.

PHENACOVOLVA EXSUL nov.

1912. *Ovula philippinarum* Verco., Trans. Roy. Soc. South Austr., Vol. xxxvi., p. 216. 40 miles west of Eucla, Western Australia. 72 fathoms. South West Australia.

Genus PELLASIMNIA.

1931. *Pellasimnia* Iredale, Rec. Austr. Mus., Vol. xviii., p. 222. June 29. Orthotype, *Ovulum angasi* Reeve.

PELLASIMNIA ANGASI Reeve.

1865. *Ovulum angasi* Reeve, Conch. Icon., Vol. xv., pl. 10, fig. 43. June. ex A. Adams MS. Port Curtis, Australia. Queensland. New South Wales.

PELLASIMNIA VERCONIS Cotton & Godfrey.

1932. *Prosimnia verconis* Cotton & Godfrey, South Austr. Nat., Vol. xiii., p. 46, pl. 1, fig. 15. February = April 15. Off St. Francis Island, South Australia. 35 fathoms.
South Australia.

PELLASIMNIA DEPRESSA Sowerby.

1875. *Ovulum depressum* Sowerby, Proc. Zool. Soc. (Lond.), 1875, p. 128, pl. 24, fig. 1. August 1. North West Australia.
North West Australia.

Family UMBILIIDAE.

This family of cold water Cowries includes some of the most interesting forms in existence as most of the species are extinct. The recent forms are placed in the genus *Umbilia*, but most of the fossil shells are referable to the genus *Rhynchocypraea* Cossmann, a most extraordinary development having been separated as a genus, *Palliocypraea*. A still more extraordinary member of the family, if it be rightly placed here, is the gigantic *Gigantocypraea* of Schilder, based on *C. gigas* McCoy, a species reaching almost a foot in length, and with corresponding height and breadth. All these are only known from the fossil beds of Victoria, Tasmania and South Australia, and the existing species live in the deep seas adjoining.

Genus UMBILIA.

1884. *Umbilia* Jousseàume, Le Naturaliste, 6th Year, p. 414. February 15.
Haplotype, *Cypraea umbilicata* Sowerby = *C. hesitata* Iredale.

UMBILIA HESITATA Iredale.

1916. *Cypraea hesitata* Iredale, Proc. Mal. Soc. (Lond.), Vol. xii., p. 93.
November. New name for
1825. *Cypraea umbilicata* Sowerby, Cat. Shells Tankerville, App., p. xxx., pl. —. January. No locality = Tasmania. Not *C. umbilicata* Dillwyn, Index Lister, p. 32, 1823.
Southern New South Wales. North Tasmania. Victoria.

UMBILIA HESITATA BEDDOMEI Schilder.

1930. *Umbilia hesitata beddomei* Schilder, Zool. Anz., Vol. xcii., p. 77.
Port Stephens, N.S.W.
Northern New South Wales.

UMBILIA (HESITATA) HOWELLI Iredale.

1931. *Umbilia (hesitata) howelli* Iredale, Rec. Austr. Mus., Vol. xviii., p. 220, pl. xxiv., figs. 1-2. June 29. South of Cape Everard, Bass Straits. 90-150 fathoms.
Off Bass Straits in deep water.

UMBILIA ARMENIACA Verco.

1912. *Cypraea umbilicata* var. *armeniaca* Verco, Trans. Roy. Soc. South Austr., Vol. xxxvi., p. 213, pl. x. 80 miles west of Eucla, Western Australia. 100 fathoms.
West Australia.

Family CYPRAEIDAE.

The Cowries proper will, very probably, be later subdivided and families separated when the animal characters become known. In this place subfamilies are only utilised as follows: Zoilinae for the West and

South Australian shells with very exsert spires and almost smooth columellar ledge; Cypræinae, the true Cowries; Talpariinae, the elongate Cowries with specialised radulae; Pustulariinae, quaint little Cowries sometimes associated with the Trivias; Erosariinae, heavy Cowries with coarse teeth; Staphylæinae, highly coloured pustulose forms with Trivia-like radulae; Nariinae, an odd small species with peculiar columella teeth; Erroneinae, a rather confused association of small species which must be later split up; and Austrocypræinae, including the small Southern Australian endemic forms and their fossil allies.

Subfamily ZOILINAE.

A group almost as interesting as the Umbilicidae, being restricted to West and South Australia, the species with very elongate spires and superficially incomplete apertural features.

Genus ZOILA.

1884. *Zoila* Jousseume, Le Naturaliste, 6th Year, p. 414. February 15.
Logotype, Jousseume, Bull. Soc. Zool. France, Vol. ix., p. 89. July,
1884. *Cypræa friendii* Gray.

ZOILA FRIENDII Gray.

1831. *Cypræa friendii* Gray, Zool. Misc., p. 35. February 19. New Holland
(Swan River).
1832. *Cypræa scottii* Broderip, Zool. Journ., Vol. v., p. 330, pl. xiv., figs. 1,
2, 3. "September, 1831" = July, 1832. "Angia, Straits of Sunda,
Java; Scott."
1930. *Zoila friendii vercoi* Schilder, Zool. Anz., Bd. 92, p. 74. Esperance,
West Australia.

West Australia. South Australia.

Note: Gaskoin described *Cypræa marginata* (Proc. Zool. Soc. (Lond.), 1848, p. 91, March 13, 1849), from unknown locality, and the type is still unique in the British Museum; it looks like an immature of this species, but has strong teeth on the inner lip.

ZOILA VENUSTA Sowerby.

1847. *Cypræa venusta* Sowerby, Proc. Linn. Soc. (Lond.), Vol. i., p. 314.
February, 1847. "Port Adelaide, South Australia" = West Aus-
tralia.
1869. *Cypræa thatcheri* Cox, Proc. Zool. Soc. (Lond.), 1869, p. 358, pl. 26,
fig. 1. September 8. Dampier's Archipelago, west coast of Aus-
tralia.
1889. *Cypræa venusta* Cox, Proc. Linn. Soc. N.S.W., Vol. iv., p. 187, pl. 15,
figs. 1, 2 (variety). Cape Naturaliste, South West Australia.
West Australia.

This rare species appears to be referable to *Zoila*, though it is not typical and the animal may necessitate revision. Gatliff (Vict. Naturalist, Vol. xxxii., p. 147, text fig., February, 1916) has described *Cypræa venusta* var. *bakeri* also from Western Australia, which looks still less like a *Zoila*.

In a Label List of the Cypræidae privately printed by Cox there appeared for the variety above-mentioned (1889) the name "*brunea*," a misspelling only for *brunnea*, but this name has been cited by Hidalgo in his Monograph, as also the var. "*distorta*," introduced at the same time by Cox for the specimen of *Cypræa vitellus* he illustrated on the same plate. Both varietal names had been previously utilised, but substitutes are unnecessary.

ZOILA THERSITES Gaskoin.

1849. *Cypraea thersites* Gaskoin. Proc. Zool. Soc. (Lond.), 1848, p. 90.
 March 13, 1849. Hab. ? = South Australia.
 West Australia. South Australia.

ZOILA THERSITES CONTRARIA subsp. nov.

1912. *Cypraea thersites* Verco, Trans. Roy. Soc. South Austr., Vol. xxxvi.,
 p. 209. Between 40 and 90 miles west of Eucla, West Australia.
 70-100 fathoms.
 West Australia (deep water).
 The subadult appearance and whitish coloration are very distinctive.

ZOILA DECIPIENS Smith.

1880. *Cypraea decipiens* Smith, Proc. Zool. Soc. (Lond.), 1880, p. 482, pl.
 xlviii., figs. 8, 8a. October. "North Australia."
 West Australia.

Subfamily CYPRAEINAE.

The type of *Cypraea* is *tigris*, and the subfamily centres round that species, including mostly large shells.

Genus MAURITIA.

1863. *Mauritia* Troschel, Das Gebiss der Schnecken, Vol. i., p. 205. (pref.
 May). Tautotype, *Cypraea mauritiana* Linné.
 1884. *Maurina* Jousseau, Le Naturaliste, 6th Year, p. 414. February 15.
 Haplotype, *Cypraea mauritiana* Linné.
 1884. *Mauxiena* Jousseau, Bull. Soc. Zool. France, Vol. ix., p. 89. July.
 Orthotype, *Cypraea mauritiana* Linné.

MAURITIA MAURITIANA Linné.

1758. *Cypraea mauritiana* Linné, Syst. Nat. xth ed., p. 721. January 1.
 "Mauritio."
 Queensland.

Although recorded by Brazier from Torres Straits sixty years ago, it had not been collected recently on the Great Barrier Reef until I found one at Three Isles, but as Father Schwarz had secured many at Cape Bedford it may be a more common mainland form. It was, however, described from Mauritius, and Garrett records it as common all through the Pacific Islands, "more plentiful at the Marquesas than elsewhere."

Quoy and Gaimard have figured and described the animal from New Ireland, thus: "The animal has elongated tentacles of a violaceous brown, the same colour as the respiratory siphon which is fringed at the edge. The foot, voluminous, rounded behind, more developed in front presents here a red brown line behind which is another pale yellow one. In the rest of its extent it is a dirty violaceous.

"The lateral parts are of a more definite violet, darker than that of the mantle, which is garnished with rather short blackish tubercles. The mantle never appears to cover the shell entirely as in some other species."

Individual coloration and form in the shell appear so variable that probably the animal will offer better characters for subspecific separation.

Genus ARABICA.

1884. *Arabica* Jousseau, Le Naturaliste, 6th Year, p. 414. February 15.
 Tautotype, *Cypraea arabica* Linné.

ARABICA ARABICA Linné.

(Plate viii., figs. 1, a.)

1758. *Cypraea arabica* Linné, Syst. Nat., xth ed., p. 718. January 1. Straits Sunda.

Queensland. New South Wales. West Australia. North Australia.

Mr. Melbourne Ward's painting of this common Queensland species agrees fairly well with Quoy and Gaimard's figure and description of a specimen from Dorey, New Guinea, thus: "The animal is sombre in colour as the shell. The tentacles are long and slender; they are, as the siphon and mantle, of a vinous brown. The latter is sprinkled with small simple white tubercles. The sides of the foot are a little darker brown and yellow orpin below."

Confused with other species as "*reticulata*," "*histrion*," "*eglantina*," etc., it is difficult to separate shells. The Queensland form, here figured, varies somewhat, but never seems to take on the extreme forms, though resemblances can be seen.

ARABICA WESTRALIS sp. nov.

[1784. *Cypraea reticulata* Martyn, Univ. Conch., Vol. i., fig. 15. Friendly Islands. Non-binomial. Not *C. reticulata* Gmelin, Syst. Nat., pt. vi., p. 3420, 1791.]

In West Australia a shell recalling Martyn's figure occurs alongside the true *arabica* style, and an "*eglantina*" form discussed below. Regarding the different animals, Garrett wrote of "*reticulata* Martyn": "Common all through Eastern Polynesia. This species is quite distinct from *C. arabica*, with which it is sometimes confounded. The animal has a snuff-brown mantle, which is nearly colourless on the margins, and furnished with small, subulate, tentacular processes of a pale grey colour. Upper surface of the foot purple-black, delicately mottled with a lighter shade; creeping disk pale grey. Muzzle and tentacles purple-black, the latter with a basal white spot."

Of *intermedia* Gray, he commented: "This species, which is frequently confounded with *C. reticulata* Martyn, is nevertheless quite distinct. It is more abundant at the Paumotu and Society Islands than elsewhere. . . . The animal has a tawny foot, shaded above with slate, and the siphon and tentacles of the latter hue. Mantle brownish-slate, garnished with small, conical, pale papillae."

Quoy and Gaimard under the name *C. histrion* described a specimen from Tonga Tabu, as follows: "Tentacles very long, pointed, greenish brown at their extremities, of a yellowish white at the base, which is very swollen. The trunk is brown, nearly black on the sides, cerise red at its extremity. The respiratory siphon is fairly long, fringed, and of a greenish colour. The foot is yellow orpin below, and a dirty yellowish green on the sides. The mantle presents some little yellowish much branched tufts. The ground colour is smoky spotted with white, with many blotches of blackish, and some yellowish lunules."

ARABICA PERCONFUSA sp. nov.

Vayssière (Journ. de Conch., Vol. liii., p. 13, pl. 1, fig. 3, May 25, 1905) described *Cypraea arabica* var. *couturieri* from the Island Polillo, Philippine Islands, a large pale coloured form of *arabica*, 73 mm. long by 43 mm. broad and 40 mm. high, showing three indistinct transverse reddish bands. Hedley received many shells from North West Australia which agreed in

shape and general coloration with Vayssières form, but lacked the essential banding upon which the variety was based. Nevertheless, Hedley recorded it under Vayssières' name, but allotted it to a species, *eglantina*, instead of *arabica*. Duclos described *Cypraea eglantina* (Mag. de Zool., Cl. v., pl. 28, dated July 15, 1833) from "California," and the name has been commonly used for a pale yellowish elongate *arabica*-like shell, but Duclos' figure shows a rather small normal *arabica* of a greenish grey coloration, and Duclos' reason for separating it reads: "Il consiste en une tache brune triangulaire placée à côté de la spire," a feature common to all "*arabica*."

The two West Australian species can be described together: *westralis* is stout, heavily flanged and flat based; *perconfusa* is more elongate, not flanged, and the base convex; the former has a pale brownish white ground colour streaked with dark brown with pale spots left, sometimes giving the shell a spotted appearance; the base is pale brownish white with a rosy tinge and the edges are very heavily spotted with large black spots; the teeth are rather small and marked with dark brownish red, numbering about twenty-one to twenty on each lip; the measurements of a norm are, length 63 mm. by breadth, 40 mm. The other species, *perconfusa*, has a yellowish ground colour with pale yellow streaks, the paler spotting not being so noticeable; the base is somewhat uniform fawn with the teeth more numerous, from thirty to thirty-five on each lip and only faintly marked with reddish; the sides of the base are somewhat sparsely and obscurely spotted with brown; the measurements of a norm being, length 70 mm. by breadth, 38 mm.

Quite recently, Mr. A. J. Thackway has collected at Caloundra, Queensland, a shell quite like *westralis*, and differing from the long series collected at Low Isles. In the Museum collection there is an immature specimen from Point Cartwright, a little north of Caloundra, procured by Mr. A. A. Livingstone, which is of the same "*westralis*" style suggesting that there may be a relative of that species on the Queensland coast as distinct from the Queensland reef forms. Shirley recorded *histris* and *reticulata* from Cairns.

ARABICA SCURRA Gmelin.

1791. *Cypraea scurra* Gmelin, Syst. Nat., pt. vi., p. 3409. May 14. Mart. Conch. 1, t. 27, figs. 276-277. Chemn. Conch., 10, 103, t. 144, figs. 1338, a-b. In Mari indico = Amboina.
1791. *Cypraea indica* Gmelin, Syst. Nat., pt. vi., p. 3412. May 14. Rumph. Mus., t. 39, fig. H. "India" = Amboina.
1798. *Cypraea argiolus* Bolten, Mus. Bolten, pt. ii., p. 26. September. For Chemn., 10, t. 144, figs. 1338, a-b. New name only for *C. scurra* Chemnitz = Amboina.
1852. *Cypraea amarata* Morch, Cat. Conch. Yoldi, pt. i., p. 114. August. ex Meuschen, 1787. Not in Index Gronov. New name for *scurra* Gmelin.

Northern New South Wales. Queensland. West Australia.

This curious little species appears to have a distinct animal, as described by Garrett from the Paumotus: "Animal olivaceous brown, with a pale locomotive disk. Mantle with small, rather remote, elongate, conical papillae. Siphon with a terminal fringe."

Genus LEPORICYPRAEA.

1930. *Leporicypraea* Iredale, Mem. Queensland Mus., Vol. x., p. 83. Aug. 28. Orthotype, *Cypraea mappa* Linné.

LEPORICYPRAEA MAPPA Linné.

1758. *Cypraea mappa* Linné, Syst. Nat. xth ed., p. 718. January 1. First reference, Rumph. mus. t. 38, fig. B. "O. Africae" error = Amboina. Queensland.

LEPORICYPRAEA VALENTIA Perry.

1811. *Cypraea valentia* Perry, Conchology, pl. xxiii., fig. 2. April 1. Amboyna (Lord Valentia).
 1824. *Cypraea princeps* Gray, Zool. Journ., Vol. i., p. 75. March. Persian Gulf. (Mus. Sowerby). Queensland.

Cox recorded (Proc. Linn. Soc. N.S.W., Vol. vi., p. 539, December, 1881) a fine specimen from Warrior Reef, Torres Strait, apparently the only local occurrence.

Genus LYNCINA.

1863. *Lyncina* Troschel, Das Gebiss der Schnecken, Vol. i., p. 205. (pref. May.) Logotype, Tryon, Struct. Syst. Conch., Vol. ii., p. 198, 1883. *Cypraea lynx* Linné = *C. vanelli* Linné.

LYNCINA VANELLI Linné.

(Plate viii., figs. 10, a-b.)

1758. *Cypraea vanelli* Linné, Syst. Nat., xth ed., p. 720. January 1. For Pet. gaz., t. 95, fig. 9. No locality.
 1758. *Cypraea lynx* Linné, Syst. Nat., xth ed., p. 721. January 1. For Gualt., test. t. 14, fig. C. Madagascar. Queensland. New South Wales. West Australia.

The spotted young upon which *vanelli* was based is characteristic of this group, and it may be that subspecies can be based upon the juvenile differences. This spotting is followed by a brown splashing which is overlain by a blue wash with spots. Sometimes the brown persists until senility; in others the blue overruns the whole shell.

Mr. Melbourne Ward's notes read: "Mantle dark brown, irregularly mottled with darker brown, almost black. Papillae of two forms, simple and minute, and large tufted and tree shaped."

Genus PONDA.

1884. *Ponda* Jousseume, Le Naturaliste, 6th Year, p. 415. February 15. Logotype, Jousseume, Bull. Soc. Zool. France, Vol. ix., p. 95. July, 1884. *C. achatina* Sol. = *C. ventriculus* Lamarck.

PONDA CARNEOLA Linné.

1758. *Cypraea carneola* Linné, Syst. Nat., xth ed., p. 719. January 1. First reference, "Rumph. mus. t. 38, fig. K., Carneola." "Asia," therefore restricted locality must be Amboina. Queensland. New South Wales. West Australia.

The animal is black, but no notes were taken. Quoy and Gaimard have figured and described the animal under the name "*isabella*" with a short description only: "The tentacles very slender. They are, the same as all the parts of the body, of a beautiful velvety black, which contrasts

with the orange of the shell." This is of a Tonga Tabu specimen. The type of *Ponda, ventriculus* Lamarck, though sometimes recorded from Queensland, is restricted to the islands of the Pacific Ocean, and the immature agrees generally with that of the present species, and disagrees entirely with that of the preceding group wherein it was placed by Schilder.

Genus MYSTAPONDA.

1930. *Mystaponda* Iredale, Mem. Queensland Mus., Vol. x., p. 83. August 28. Orthotype, *Cypraea vitellus* Linné.

MYSTAPONDA VITELLUS Linné.

(Plate viii., figs. 5, a, b.)

1758. *Cypraea vitellus* Linné, Syst. Nat., xth ed., p. 721. January 1. Sunda, Asia.
Queensland. New South Wales. West Australia.

Mr. Melbourne Ward's painting needs little additional description, but Mrs. Coxen has described the animal as follows: "Mantle creamy white, largely mottled with black, full of minute white dots, also many spicules one-eighth of an inch high, terminating in two or three points; respiratory canal creamy white, with fine yellow fringe at the edge; tentacles black. The little spicules on the mantle are only perceptible when the animal is in the water."

Quoy and Gaimard described an animal from Tonga Tabu, but only figured the under surface and wrote: "The animal has the tentacles very thick at their bases until the place where the eyes are situated, thence for the rest of their length they are more slender, pointed, dull smoky. The foot is of mediocre extent, oval, rounded behind, arched and dilated in front. It is yellowish below, striated lengthwise with orange yellow. The siphon and the mantle are covered with yellow branched appendages. The mantle is spotted with yellow, black and white, but the yellow predominates."

There is variation seen among shells from different localities, but geographic subspecies have not yet been determined. It may be that the coloration of the animals will assist in the differentiation of subspecies. The curious form added below has not yet been recognised from any other place, though quite long series of this comparatively common shell have been examined, and quite a large variation in size has been recognised.

MYSTAPONDA ORCINA Iredale.

1931. *Mystaponda orcina* Iredale, Rec. Austr. Mus., Vol. xviii., p. 220, pl. xxiv., figs. 9, 10. June 29. Sydney Harbour, N.S.W.
New South Wales (perhaps extinct).

Genus CYPRAEA.

1758. *Cypraea* Linné, Syst. Nat., xth ed., p. 718. January. Logotype, Montfort, Conch. Syst., pt. ii., p. 631. May. *Cypraea tigris* Linné.
[1797. *Porcellana* Humphrey, Mus. Calonn., p. vi. May. Later *Porcellana* was used by Jousseau, who named *argus* as type of Klein's genus, but the name was at that time invalid.]
1863. *Tigris* Troschel, Das Gebiss der Schnecken, Vol. 1., p. 204 (pref. May). Tautotype, *Cypraea tigris* Linné.
1884. *Vulgusella* Jousseau, Le Naturaliste, 6th year, No. 52, p. 414. Feb. 15. Logotype, Jousseau, Bull. Soc. Zool. France, Vol. ix., p. 90. July, 1884. *Cypraea tigris* Linné.

CYPRAEA TIGRIS Linné.

1758. *Cypraea tigris* Linné, Syst. Nat., xth ed., p. 721. January 1. Many references. "Madagascar," which must be restricted type locality. Queensland. West Australia. South Australia. ??

A very variable species, which cannot be easily separated into subspecies, although colour variations recur in a curious manner in various localities and should bear recognisable names.

Quoy and Gaimard's figure has been copied so often that it has become well known; their description of an animal from Tonga Tabu reads: "The tentacles are very long and pointed. The siphon thick, short, wide and funnel shaped, denticulate at the edge. The mouth is elongated in the form of a wide trunk. Greenish throughout. The foot, very large and broad, extends in front and behind the shell. It is of a dirty red brown below, spotted with greenish and yellow on the sides; it is uniformly of this latter colour at the junction with the mantle. This latter is covered with little branches, divided at their extremities in two or three fingers. These are white at the point and at their base, and greenish yellow on the middle. The ground colour of the mantle is of clear yellow, very finely striated lengthwise with black; it is also marked with large black spots in the form of festoons."

Garrett's description reads: "The animal has a creamy-yellow mantle, closely veined longitudinally with deep brown, and marked with a few diffuse spots of the same colour. It is also furnished with small, stout, tentacular processes of an amber-yellow colour, tipped with white; the processes are either cylindrical or slightly compressed, and simple or bifid. Head, tentacles and siphon grey. The upper surface of the foot is marbled with black, deep brown, and fawn-yellow, creeping disk purple brown with darker veins."

[CYPRAEA PANTHERINA Solander.

1786. *Cypraea pantherina* Solander, Cat. Portl. Mus., p. 50 (ante April 24), for Lister, 681, 28. No locality. Lister gives "Mare Mediter.," error = Red Sea.
1791. *Cypraea vinosa* Gmelin, Syst. Nat., pt. vi., p. 3421. May 14. For Bonann. recr. 3, fig. 253 and mus. Kirch. 3, fig. 252. "In Mare Mediterraneo" = Red Sea.

Brazier recorded *C. pantherina* (Proc. Linn. Soc. N.S.W., Vol. vii., p. 322, 1887) from Rowley Shoals, North West Australia, and therefore Hedley included it in his West Australian List under the name, *C. vinosa* Gmelin. Since then Cotton and Godfrey have recorded *C. pantherina* Dillwyn from South Australia (South Austr. Nat., Vol. xiii., p. 40, 1932), noting, "North Arm (Port River) one, alive (Matthews)." There must be some mistake in each of these records as the true *pantherina* lives only among the coral reefs of the Red Sea, and is unknown elsewhere. Though superficially resembling *tigris* very closely, it may be even referable to a different series, and Sacco introduced *Pantherinaria* (I. Molluschi terr. terz. Piemonte e Liguria, pt. xv., p. 10, April, 1890), with this species as type.

Shirley also recorded *C. pantherina* from Torres Straits, also in error.]

GENUS TALPARIA.

1863. *Talparia* Troschel, Das Gebiss der Schnecken, Vol. i., p. 204 (pref. May). Tautotype, *Cypraea talpa* Linné.

TALPARIA TALPA Linné.

1758. *Cypraea talpa* Linné, Syst. Nat., xth ed., p. 720. January 1. First reference, "Rumph. mus. t. 38, fig. I. Talpa." "Asia." Therefore restricted type locality must be Amboina. Queensland.

Quoy and Gaimard figured and described the animal of this species from Mauritius as follows: "The animal of this Cowry does not differ. It is dark, as the shell which secretes it, and its mantle is covered with, instead of delicate branches, small rounded tubercles, whitish and reddish. The remainder of its colour is a reddish brown, very dark, almost chocolate. The siphon, the tentacles and the sides of the foot are of the same tint. The latter only is the colour of sombre lake below."

Australian shells vary in shape, some cylindrical like typical *talpa*, others more pear-shape, recalling the Red Sea *adusta*, but with the teeth of *talpa*.

GENUS ARESTORIDES.

1930. *Arestorides* Iredale, Mem. Queensland Mus., Vol. x., p. 81. August 28. Orthotype, *Cypraea argus* Linné.

ARESTORIDES ARGUS Linné.

1758. *Cypraea argus* Linné, Syst. Nat., xth ed., p. 719. January 1. The third reference is "Rumph. mus. t. 38, fig. D. Argus." "O. Africae." The restricted type locality is Amboina. Queensland. West Australia.

GENUS BASILITRONA.

1930. *Basilitrona* Iredale, Mem. Queensland Mus., Vol. x., p. 81. August 28. Orthotype, *Cypraea isabella* Linné.

BASILITRONA ISABELLA Linné.

1758. *Cypraea isabella* Linné, Syst. Nat., xth ed., p. 722. January 1. First reference, "Rumph. mus. t. 39, fig. G. Isabella." Therefore, though "Mauritio, Madagascar," is given, restricted type locality must be Amboina.

Queensland. New South Wales. West Australia.

The animal of the Queensland specimens was merely noted as "black," but Garrett has described it thus: "The animal is deep black, with a brown black mantle, which, instead of being garnished with the usual tentacular processes, is simply roughened with fleshy granules. The short siphon is also without the usual terminal fringes."

Quoy and Gaimard figured the animal of *carneola*, under the name *isabella*, from Tonga Tabu, with the very brief description: "The tentacles very slender. They are, the same as all the parts of the body, of a beautiful velvety black, which contrasts with the orange of the shell." This almost equally applies to *isabella*.

Subfamily PUSTULARIINAE.

Very small beaked Cowries, that have often been placed with the Trivias, but which constitute a group perhaps of higher value than a subfamily.

GENUS PUSTULARIA.

1840. *Pustularia* Swainson, Treat. Malac., p. 324. May. Haplotype, *Cypraea cicercula* Linné (*globulus* cited as aberrant).

1854. *Epona* H. & A. Adams, Gen. Rec. Moll., Vol. i., p. 269. January. Same type.

PUSTULARIA CICERCULA Linné.

1758. *Cypraea cicercula* Linné, Syst. Nat., xth ed., p. 725. January 1. Gualt. test. t. 14, fig. T. "M. Mediterraneo," error. Restricted type locality is Amboina. Queensland.

PUSTULARIA GLOBULUS Linné.

1758. *Cypraea globulus* Linné, Syst. Nat., xth ed., p. 725. January 1. First reference, "Rumph. mus. t. 39, fig. L. Globulus." "Asia." Restricted type locality is Amboina. Queensland. West Australia.

Genus NUCLEARIA.

1884. *Nuclearia* Jousseau, Le Naturaliste, 6th Year, p. 415. February 15. Logotype, Jousseau, Bull. Soc. Zool. France, Vol. ix., p. 98, 1884. July. *Cypraea nucleus* Linné.

NUCLEARIA NUCLEUS Linné.

1758. *Cypraea nucleus* Linné, Syst. Nat., xth ed., p. 724. January 1. First reference, "Rumph. mus. t. 39, fig. I. "O. Indiae orientali." Therefore restricted type locality is "Amboina." Queensland.

The animal is black, but no other notes were taken.

[Genus ANNEPONA NOV.

Type, *Cypraea annulata* Gray. =
Pustularia mariae Schilder.

This beautiful little species differs in lack of sculpture, and especially in apertural features from *Pustularia*, the mouth being normal, instead of being very narrowed and rostrate.

ANNEPONA MARIÆ Schilder.

1927. *Pustularia mariae* Schilder, Archiv. für Naturg. (Wieg.), 91st year, Abt. A., heft 10, p. 104. New name for
1828. *Cypraea annulata* Gray, Zool. Journ., Vol. iv., p. 88. July. ex Vol. i., p. 513, Jan., 1825, *nom. nud.* Pacific Ocean.

This species does not occur in South West Australia, although admitted by Schilder at the place cited.]

Subfamily EROSARIINÆ.

This subfamily probably needs reorganisation, as the *caputserpentis* series appears discordant, but the other forms have all similar animals.

Genus RAVITRONA.

1930. *Ravitrona* Iredale, Mem. Queensland Mus., Vol. x., p. 81. August 28. Orthotype, *Cypraea caputserpentis* Linné.

RAVITRONA CAPUTSERPENTIS Linné.

1758. *Cypraea caputserpentis* Linné, Syst. Nat., xth ed., p. 720. January 1. Mauritius. Restricted type locality is "Mauritius." Queensland. New South Wales. West Australia.

Quoy and Gaimard have described the animal from Mauritius as: "The animal has the tentacles red brown and slender to the point, white and

thick at the base. The respiratory siphon is also white, but the fringes are rose. The foot, a little auriculated in front, is pale yellow below, smoky and spotted on the sides, yellowish at the junction with the mantle. It is red brown, with a brown spot anteriorly, brownish at the extremity. The mantle is covered with whitish branching papillary processes, of which the points are of a pretty red; it is further ornamented with very large greenish spots and besides yellowish ones very difficult to show in the painting."

Garrett described the animal of the shell from the Sandwich Islands, called "*caput-anguis*," as follows: "The animal has a dark brown mantle, varied with dark green, and garnished with red, or red and white, more or less divided processes. The siphon is dusky-slate, tentacles brown with white bases, and the foot dusky slate with a paler creeping disk."

The name "*caput-anguis*" has been used for many forms, even in connection with Australian shells, but the local shells are certainly of the true *caput-serpentis* style, but seem to develop very slowly. The majority of the shells found in New South Wales are subadult—that is, with teeth formed but without any dilatation of the edges; they are also very dark, some almost black, and almost deserve subspecific separation. However normal shells are sometimes found, and as close as Moreton Bay and the Capricorn Group, normal shells are in the majority, as they are commonly further north.

Genus EROSARIA.

1863. *Erosaria* Troschel, Das Gebiss der Schnecken, Vol. i., p. 205. Logo-type, Jousseaume, Bull. Soc. Zool. France, Vol. ix., p. 96. July, 1884. *Cypraea erosa* Linné.

EROSARIA EROSA Linné.

(Plate viii., figs. 7, a, b.)

1758. *Cypraea erosa* Linné, Syst. Nat., xth ed., p. 723. January 1. First reference, "Rumph. mus. t. 39, fig. A.," but localities Mauritio and I. Ascension. The type locality must be Mauritius

Queensland. New South Wales. West Australia.

This species shows great variation over its range, but not much has yet been seen among Australian shells. The animal has been described by Mrs. Coxen thus: "Foot creamy white, mottled with brownish markings; mantle dark brown, covered with long moss-like filaments about one-eighth of an inch in length, some light brown, others of a bluish tint; respiratory canal dark brown with a fringe at the edge; tentacles blackish-brown; around the trunk a light brown fringe."

Of "*erosa* Lin.," Garrett wrote: "Not uncommon at all the groups. The animal, when fully expanded, is really a beautiful object. The mantle is cinereous, clouded with dusky, veined with black and white, and ornamented with numerous simple and branched processes of a greyish hue, annulated with opaque-white, and tipped with vermilion-red. The dusky-grey siphon is dotted with diluted white, and the end is fringed with short, blunt, pink tentacular processes. The upper surface of the foot is delicately marbled with light brown and ochre-yellow. Head tinged with cherry-red."

Quoy and Gaimard described and figured an animal from Tonga Tabu thus: "The animal has the tentacles and the siphon, which is large and fringed, yellowish, as the sides of the foot, which has near the edge a brown line. The foot is reddish below. The appendages of the mantle

are numerous, large, very branched and reddish at their extremity. The mouth is of a deep red."

Vredenberg (Journ. Proc. Asiat. Soc. Bengal, n.s., Vol. xv., p. 145, Aug., 1919) described a *Cypraea erosa* var. *purissima* from "Moreton Bay, Queensland," which apparently never came from that locality.

EROSARIA PORARIA Linné.

1758. *Cypraea poraria* Linné, Syst. Nat., xth ed., p. 724. January 1. No references nor locality. Restricted type locality Amboina. New South Wales.

Garrett has described the animal from the Pacific Isles as "The animal is vermilion-red, with a greenish-grey mantle, which latter is garnished with small crowded, tentacular appendages, varied with white and green. Siphon fringed. Upper surface of the foot dotted with greenish-grey."

EROSARIA WILHELMINA Kenyon.

1897. *Cypraea wilhelmina* Kenyon, Proc. Linn. Soc. N.S.W., Vol., xxii., p. 145. September 17. Western Australia. Western Australia.

EROSARIA HELVOLA Linné.

1758. *Cypraea helvola* Linné, Syst. Nat., xth ed., p. 724. January 1. No references nor locality. Restricted type locality, Maldive Isles. Queensland. New South Wales. West Australia.

Garrett described the animal from the Pacific Islands as: "The animal has a brownish-red mantle, which is minutely flecked with greenish-white, and garnished with numerous, more or less divided, lighter-coloured processes, which are dotted with vermilion red. Siphon dotted with light yellow, veined with cherry red. The foot is pale luteous, mottled with cherry red; tentacles of the latter hue."

Off North West Island, Capricorn Group, Queensland, Mr. Melbourne Ward dredged a specimen of this species which had the dorsal colour reddish brown overlaying the normal spotted coloration which only showed near the opening of the mantle on the centre of the back; the edges of the shell are brownish yellow, as is the whole of the base, which is a little darker medially. Unfortunately this was before he took an interest in the animals, so that we do not know whether the animal's coloration varied. From West Australia Brazier has recorded *C. citrina*, but the specimens so named are merely *helvola*, the teeth being coarse, not fine, and the curious greenish brown overlays the normal spotting, but apparently the shell has always been greenish. It may be as well to name the West Australian form *Erosaria helvola citrinicolor* subsp. nov., to note this tendency.

EROSARIA NASHI Iredale.

1931. *Erosaria nashi* Iredale, Rec. Austr. Mus., Vol. xviii., p. 219, pl. xxiv., figs. 5, 6. June 29. Sydney Harbour, New South Wales. New South Wales. Queensland.

This species has been recorded as *Cypraea flaveola* Linné (Syst. Nat., xth ed., p. 724, January 1, 1758), but that species was described without references or locality, and the earlier attempts at determination were somewhat discordant. Later, Gaskoin's varietal name *labrolineata* or Sowerby's *labiolineata* was advocated, but each is unacceptable.

EROSARIA PERCOMIS Iredale.

1931. *Erosaria percomis* Iredale, Rec. Austr. Mus., Vol. xviii., p. 219, pl. xxiv., figs. 15, 16. January 29. Sydney Harbour, N.S.W. New South Wales.

EROSARIA METAVONA SP. NOV.

I recorded specimens from Sydney Harbour under the name *miliaris* Gmelin, but Gmelin's species (Syst. Nat., pt. vi., p. 3420, May 14, 1791) was made up of forms of *erosa* and the shell later known as *miliaris*, but its basis was undoubtedly the former, and the name must disappear in the synonymy of *erosa*. This was pointed out more than one hundred years ago, and confusion has reigned ever since through attempts to disguise and hide the truth.

Living specimens have been collected at Murray Island by Hedley, and Keppel Islands by Mr. H. Bernhard, and these do not agree with either Reeve's figure of his so-called *miliaris* nor Sowerby's illustration. Consequently, to avoid further error, the Queensland shell is here described. The shell is pyriform, the anterior end a little pinched, the coloration very pale green, spotted with small white spots, the edges and base pure white, the mouth armed with a few strong teeth, fifteen on the inner lip, sixteen on the outer lip, the two anterior projecting outwards. Length, 36 mm.; breadth, 23 mm.; height, 21 mm.

EROSARIA EBURNEA Barnes.

1824. *Cypraea eburnea* Barnes, Ann. Lyc. Nat. Hist., New York, Vol. i., p. 133. September. China. Queensland.

I have seen no Australian specimens.

Genus MONETARIA.

1863. *Monetaria* Troschel, Das Gebiss der Schnecken, Vol. i., p. 205 (pref. May). Tautotype, *Cypraea moneta* Linné.
 1837. *Aricia* Broderip, Penny Cyclopaedia, Vol. viii., p. 256, June, ex Gray MS. Logotype, Herrmannsen, Index Gen. Malac. Suppl., p. 12, 1852. *Cypraea moneta* Linné. Not *Aricia* Savigny, 1822. Cf. Iredale, Proc. Mal. Soc. (Lond.), Vol. xii., p. 34, 1916.
 1888. *Mercatoria* Melvill, Proc. Manch. Lit. Philos. Soc. (4), Vol. i., pt. 5, p. 240. Error only.

MONETARIA MONETA Linné.

1758. *Cypraea moneta* Linné, Syst. Nat., xth ed., p. 723. January 1. Many references. Localities given as "Africa," "M. Medit.," but restricted type locality is Maldives Islands. Queensland. New South Wales. West Australia.

Many subspecies will later be recognised, but owing to Rochebrune providing many names without localities, the determination will be difficult. Probably criticism of the animals will assist, as Quoy and Gaimard have described a specimen from Tonga Tabu thus: "The animal has the tentacles long, slender, whitish; the siphon fringed; the mantle clear yellow, striated transversely with black, and further covered with a mass of appendages white and branched. The foot, fairly large, is also yellowish with brownish transverse striae."

Garrett wrote: "Animal diluted white or creamy-white, the mantle elegantly veined with deep black, and ornamented with numerous simple and dendritic processes which are ringed with opaque white and tipped

with lilac. The tentacles are veined with black. Siphon with a terminal fringe, and the muzzle is light buff yellow."

With regard to the shell some deep yellow ones have been found on the Queensland reefs, but this colour seems more common in West Australia. The shell of this species is easily separated from that of *annulus* by its smaller more crowded teeth.

[MONETARIA OBVELATA Lamarck.

1810. *Cypraea obvelata* Lamarck, Ann. Mus. Nat. Hist. Paris, Vol. xvi., p. 102, post Oct. "New Holland."

Although Shirley has recently recorded this from Queensland, the species only lives in the Eastern Pacific, as pointed out by Garrett sixty years ago.]

MONETARIA ANNULUS Linné.

(Plate ix., figs. 10, a, b.)

1758. *Cypraea annulus* Linné, Syst. Nat., xth ed., p. 723. January 1. First reference, "Rumph. mus. t. 39, fig. D." Amboina.

Queensland. New South Wales. West Australia.

Again it is difficult at present to indicate subspecies, but Quoy and Gaimard have described and figured from Tonga Tabu, a very different animal from ours, thus: "The animal has the tentacles, long, pointed, white at the base, which is swollen, yellowish to the rest of their extent, with two brown lateral lines. The mouth is circled with blackish. The large foot is suboval, nearly square in front, of a yellowish white below, a little smoky on the sides. The mantle is of a beautiful orange, covered with simple tubercles of the same colour and spotted with black."

Mr. Melbourne Ward notes: "There are two forms of papillae, the simple more numerous, the branching ones fewer. Siphon pale grey, its edge with fine fringe, the tentacles pale grey."

My own notes read: "Pale greenish white lined with black; filaments nearly white; siphon long, fringed, greenish; tentacles yellowish." Q'd.

Subfamily STAPHYLAEINAE.

Troschel (Das Gebiss de Schnecken, Vol. i., pp. 212/213, 1863) has figured the radulae of "*staphylaea*" from the Philippines, and "*limacina*" from Querimba Island. These radulae resemble those of the Triviidae more than those of Cowries, generally speaking, and hence many people have classed these species with *Trivia*. Apparently we have here a group with distinct genera and species, but how many is puzzling, as it has been a common practice to regard them as one species.

Genus STAPHYLAEA.

1884. *Staphylaea* Jousseau, Le Naturaliste, 6th Year, p. 96. February 15. Tautotype, *Cypraea staphylaea* Linné.

STAPHYLAEA STAPHYLAEA Linné.

1758. *Cypraea staphylaea* Linné, Syst. Nat., xth ed., p. 725. January 1. No references nor locality. Restricted type locality: Mauritius.

New South Wales. Queensland.

Garrett described the animal of "*staphylaea* L." thus: "The animal has a thin elongate, oblong foot, acutely rounded behind, slightly auriculate in front. Tentacles long and slender, bearing the eyes on small basal enlargements. The short siphon is fringed. Mantle processes large, rather crowded, tentaculiform, with a few dendritic ones intermixed. The

creeping disk is pale purple brown, lighter in front, and delicately veined with a darker shade. Siphon and the upper surface of the foot blackish-brown, the mantle deep brown, which, with the upper surface of the foot, is minutely dotted with white."

My own notes were simple: "Brown black animal, covered with single elongate papillae, whitish."

These descriptions refer to the smaller shell known as "*staphylaea*" with the pustulose shell, and the base crossed with brown lines.

A series from North West Isle, Capricorn Group, Queensland, are short, ovate oblong, pale grey, with crowded elevated small pustules, whitish; the base is pale fawn, and the teeth extend right across the base, each tooth having a fine red line at each side, twenty-two teeth on the outer lip, others intercalating at the edge; about the same number on the inner lip, but the intercalating ones increasing marginad; the size of a norm is 23 mm. in length, 14 mm. in breadth, and 11.5 mm. in height. For exact comparisons this may be regarded as a subspecies, with the new name *S. staphylaea descripta* nov.

Genus PURPEROSA nov.

Type *P. facifer* nov.

The extraordinary animal here figured is so unlike that of *Staphylaea* that a new genus is absolutely necessary. Apparently the radular characters will follow those of the shell which is of the form known as "*limacina*," the larger shell with white spots but scarcely pustulose, and the base not entirely crossed with lines.

PURPEROSA FACIFER sp. nov.

(Plate viii., figs. 6, a, b.)

This kind of shell has been known as *Cypraea limacina* Lamarck, but Lamarck's shell was described (Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 101, after October, 1810) from unknown locality and certainly not Queensland, where moreover there may be two species of this genus. Under the incorrect name of *Cypraea nucleus*, Quoy and Gaimard described an animal from Tonga Tabu, thus: "This elegant little species is entirely covered by its mantle, which is garnished with long and thick simple filaments of a fiery red, the same colour as the foot, the tentacles and the siphon. The last-named is elongate and equally fringed."

Note that Quoy and Gaimard figure and describe the filaments as "long and simple," whereas the Queensland shell has them very clearly branched, a distinct difference. The shell of the Lindeman Island animal, here figured, measures 33 mm. in length, and 19 mm. in breadth, the height being 16 mm. The figure shows the under surface well and none of the spots on the upper surface is raised. Similar shells have been secured at other places in Queensland and New South Wales, and comparable specimens are known from the Pacific Isles. However, from North West Isle, Capricorn Group, Queensland, a series of about the same shape and size and with similar basal features are very pale above and the white spots are raised, thus simulating on the upper surface "*staphylaea*." These are recorded as having a red animal, while living with them are the true "*staphylaea*," as regards conchological characters, with a black animal very like the picture here given of the animal of "*clandestina*." The exact distinction of the two groups in Australia necessitates a revision of extralimital shells, and from the specimens available here many species must be admitted, and some will depend on the animal features for generic

location. The pustulose North West Isle shell may be an advanced state of evolution, and thus is of importance in this investigation, and may be referred to as *P. facifer monstrans* subsp. nov., the type measuring 29 mm. long, by 17 mm. broad and 14 mm. high.

[Subfamily NARIINAE.

This subfamily only includes at present one genus, *Naria*, whose shell characters are somewhat peculiar, but when the animal is known some of the species allotted to the subfamily Erroneinae may be transferred to this place.

Genus NARIA.

1837. *Naria* Broderip, Penny Cyclop., Vol. viii., p. 256, ex Gray MS. Haplo-type, *Cypraea irrorata* Gray.

NARIA IRRORATA Gray.

1828. *Cypraea irrorata* Gray, Zool. Journ., Vol. iv., p. 80. July. ex Solander MS. South Seas. Pacific Islands only.

The Queensland record is erroneous as this small species is restricted to the Eastern Pacific Ocean.]

Subfamily ERRONEINAE.

Apparently a somewhat heterogeneous association.

Genus CRIBRARIA.

1884. *Criraria* (type error), Jousseau, Le Naturaliste, 6th Year, p. 414. February 15. Tautotype, *Cypraea cribraria* Linné.

1881. *Ocellaria* Weinkauff, Jahrb. deutsch. Malak. Gesell, 8th Year, p. 133, 148. Same type. Not *Ocellaria* Ramond, Bull. Soc. Philom. Paris, Vol. ii., p. 177, 1801.

[*Cribraria* C. Persoon, in J. Römer, N. Mag. Bot., v. 1, p. 91, 1794, in Nomen. Anim. Gen. et Subgen., but not in Sherborn, Index Anim.]

CRIBRARIA CRIBRARIA Linné.

1758. *Cypraea cribraria* Linné, Syst. Nat. xth ed., p. 723. January 1. Many references. No locality. Restricted type locality, Ceylon. Queensland.

My only note is "the animal is vermilion," but Quoy and Gaimard have figured and described the animal from Carteret Harbour, New Ireland, thus: "This elegant little Cowry has the left edge of the mantle very extended, as anyone can see by the longitudinal line very low down on the right. The tentacles are long and pointed. All the animal is of a pretty cerise red. The filaments on the mantle are white without being branched."

CRIBRARIA EXMOUTHENSIS Melvill.

1888. *Cypraea cribraria* var. *exmouthensis* Melvill, Proc. Manch. Lit. Phil. Soc., Vol. i., p. 229, June. Exmouth Gulf, West Australia (T. H. Haynes). West Australia.

CRIBRARIA FALLAX Smith.

1881. *Cypraea fallax* Smith, Ann. Mag. Nat. Hist., Ser. 5, Vol. viii., p. 441. December. West Australia. West Australia.

CRIBRARIA CUMINGII Sowerby.

1832. *Cypraea cumingii* Sowerby, Conch. Illus., pt. 1, fig. 5. September 28. Catal., p. 8, November 9, ex Gray MS. No locality = Raiatea. Queensland.

CRIBRARIA GASKOINI Reeve.

1846. *Cypraea gaskoini* Reeve, Conch. Icon., Vol. iii., pl. xxii., fig. 122, Feb., Proc. Zool. Soc. (Lond.), 1846, p. 23. May. No locality. Queensland.

Genus NIVIGENA.

1930. *Nivigena* Iredale, Mem. Queensland Mus., Vol. x., p. 84. August 28. Orthotype, *Nivigena melwardi* Iredale.

NIVIGENA MELWARDI Iredale.

1930. *Nivigena melwardi* Iredale, Mem. Queensland Mus., Vol. x., p. 84, pl. ix., figs. 12, 13, August 28. North West Island, Capricorn Group, Queensland.

Mr. Melbourne Ward noted that the animal was scarlet. It has been suggested that this is a form of *cribraria*, but although the immature of *cribraria* may be pure white, the shells of *N. melwardi* are adult with thickened edges. The form is different from that of *cribraria* which also occurs in Queensland. It may be noted that Garrett recorded that the young shells of *C. gaskoini* Reeve and *C. goodalli* Gray were also pure white, but described the animal of the latter as: "The animal is creamy-white, the upper surface of the foot and mantle dotted with brown. Tentacles yellowish with brown bases. Siphon simple, and the mantle is furnished with small remote dendritic processes."

Genus DERSTOLIDA nov.

Type, *D. fluctuans* sp. nov.

The quaint animal of this shell is so distinct that it cannot be associated with any other so far described.

DERSTOLIDA FLUCTUANS sp. nov.

(Plate ix., figs. 9, a, b.)

Mr. Melbourne Ward notes: "Mantle milk white, transparent, dotted with minute black spots. Papillae more opaque white than mantle, numerous over the surface of the mantle, branching, tree-shaped. Siphon is opaque white, its anterior margins fringed. Tentacles pale yellow. Foot very large, opaque milk white unspotted. When walking, the hinder end of the shell is raised and the greater part of the foot is behind the shell."

Linné's *C. stolidus* (Syst. Nat., xth ed., p. 724, January 1, 1758) was based on "Argenv. Conch., t. 21, fig. Y," from unknown locality, and the general acceptance of the shell has the base with the teeth red-lined. None of the Australian shells show this feature, nor do they reach the size of the red-lipped species. The one here figured has no red, and is an elegant little specimen without a dark blotch on the back. All the Lindeman Island shells so far collected agree in size and shape, but a series from Torres Straits shows variation in size and form, becoming stumpy and swollen, and approximating in shape to the shell described by Sowerby as *brevidentata* (Thes. Conch., Vol. iv., Cyp., p. 111, figs. 325, 326, 1870) from Borneo, whose teeth number thirteen to fourteen. The shell figured here

measures 23 mm. long, 13.5 mm. broad and 11 mm. high, and lacks the general dorsal blotch of brown, the spire is sunken and the edges thickened and adult. Another similar specimen had a brown blotch with similar measurements. In the type the number of short teeth on the outer lip is fifteen with seventeen on the inner lip; all teeth pure white. The Torres Straits shells are all more swollen and larger with more teeth, about twenty on each lip and a norm measures 29 mm. long by 20 mm. broad and 16 mm. high. This may be named *D. fluctuans deceptor* subsp. nov., but it may be specifically distinct when the animal becomes known; the teeth are white.

Hedley collected at the Palm Islands a dead shell of the malformation described as *C. crossei* Marie, from New Caledonia (Journ. de Conch., Vol. xvii., p. 16, pl. i., fig. 3, Jan., 1869).

The animal of such a shell would be very interesting, as melanism has been generally associated with these, and its effect on a white animal should be noticeable.

Genus TALOSTOLIDA.

1931. *Talostolida* Iredale, Rec. Austr. Mus., Vol. xviii., p. 219. June 29. Orthotype, *Cypraea teres* Gmelin.

TALOSTOLIDA TERES Gmelin.

1791. *Cypraea teres* Gmelin, Syst. Nat., pt. vi., p. 3405, May 14, for Schroeter, Einl. in Conch., 1, p. 16, t. 1, fig. 7. No locality = Amboina.
1817. *Cypraea tabescens* Dillwyn, Descr. Cat. Rec. Shells, Vol. i., p. 463, ex Solander MS. "Amboina."

New South Wales. West Australia. Queensland.

Under the name "*C. tabescens* Sol." Garrett wrote: "This rather scarce Cowry was found at all the Eastern Polynesian groups. Animal vermilion red, with a pale creeping disk. Siphon dotted with whitish and fringed at the end. The mantle is ornamented with dark red spots, white dots, and studded with dendritic processes."

Hidalgo used *C. punctulata* Gmelin (Syst. Nat., pt. vi., p. 3404, 1791, for Gualt text, t. 16, fig. P. No locality) for this species, but this is an immature unrecognisable shell. This would not have mattered, but unfortunately Hedley recorded a shell from West Australia under this name. Fortunately the shell proves to be a dead worn *caurica*, the coarse teeth easily determining it, but *teres* Gmelin, is also recorded from West Australia by Thiele.

TALOSTOLIDA SUBTERES Weinkauff.

1880. *Cypraea subteres* Weinkauff, Syst. Conch. Cab. (Mart. & Chemn.), ed. Kuster, Bd. v., Abth. iii., pt. 287, p. 27, pl. viii., fig. 4, and pl. xiii., figs. 1, 4. New name for
1832. *Cypraea teres* Sowerby, Conch. Illus., pt. 3, fig. 56, Nov. 16, Cat. p. 7, Nov. 9. Haynam. Not *C. teres* Gmelin supra.
New South Wales. Queensland.

Genus PAULONARIA.

1930. *Paulonaria* Iredale, Mem. Queensland Mus., Vol. x., p. 82, August 28, Orthotype, *Cypraea beckii* Gaskoin.

PAULONARIA BECKII Gaskoin.

1836. *Cypraea beckii* Gaskoin, Proc. Zool. Soc. (Lond.), 1835, p. 203, April 8, 1836. No locality.
Queensland.

PAULONARIA MACULA Angas.

(Plate ix., figs. 7, a, b.)

1867. *Cypraea macula* Angas, Proc. Zool. Soc. (Lond.), 1867, p. 206, ex A. Adams MS. Port Jackson, N.S.W.
1896. *Cypraea interpunctata* Henn, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. x., p. 520, April 29, ex Brazier MS. Port Jackson, New South Wales. New South Wales. Queensland. West Australia.

Angas wrote: "A good species, unlike any other, and certainly not a variety of *C. fimbriata*."

Mr. Melbourne Ward notes: "The dark brown spots on the shell are visible through the mantle."

There is no doubt about the distinction of this species, and the West Australian shells at present seem inseparable. I cannot see, however, any close affinity with the species known as "*fimbriata*" here, but at Lindeman Island a larger shell was collected with a darker coloured animal which entirely covered the shell, and this answered fairly well to Melvill's *C. cholmondeleyi*, which was described from Australia. Until more specimens are secured it may be allotted to that species, but it seems to indicate that these species will later be removed from the present genus.

PAULONARIA CHOLMONDELEYI Melvill.

1888. *Cypraea fimbriata* var. *cholmondeleyi* Melvill, Proc. Manch. Lit. Phil. Soc., December 4, Vol. i., p. 216, pl. ii. fig. 15, June. Australia.

This name was introduced for a large shell like *macula*, and it may be that it was founded upon an aberration. It is being used provisionally for a large shell which was collected at Lindeman Island by Mrs. Ward, and which differs from the common shell in animal characters as noted above, but the shell is more pyriform, the anterior end more narrowed, the end blotching almost obsolete, the spotting on the back being larger and more diffuse, the teeth also a little stronger. More material may enable its distinction.

PAULONARIA FIMBRIATA Gmelin.

1791. *Cypraea fimbriata* Gmelin, Syst. Nat., pt. vi., p. 3420, May 14, for Martini, Conch. 1, t. 26, figs. 263, 264, p. 350. No locality. Queensland. New South Wales.

The determination of this species is involved, through the continual acceptance by many authors of *macula* as a variety. The species, *macula*, is well known here, but the shell we are calling *fimbriata* is nothing like, and can never be considered as a variety. The figures given by Sowerby (Thes. Conch., Vol. iv., *Cypraea*, pl. xxxii., figs. 390, 391, 1870) are like our small shell, but it is quite constant in size and shape, and never approaches *macula* at all. Probably the animal of our species will be found to differ entirely from that of *macula*; it has been collected alive around Sydney, and also at North West Isle, Capricorn Group, Queensland, but no notes were taken.

Garrett wrote under the name "*C. fimbriata* Gmel." Diffused nearly all over Polynesia. Not by any means common. The animal is cherry-red, with a paler creeping disk, and the cinereous siphon is anteriorly fringed. The mantle is ornamented with simple, scattered, pale tentacular processes."

This reads rather like that of *macula*, but unfortunately none of Garrett's shells are available.

PAULONARIA MICRODON Gray.

1828. *Cypraea microdon* Gray, Zool. Journ., Vol. iv., p. 71. July. Pacific Ocean.

This species is not unlike the preceding in size and form, but differs in the greater number of teeth. Melvill (Journ. of Conch. (Leeds), Vol. x., pp. 117-119, October, 1901) has given details of the type shell establishing exactly its identity. In that place he associated *microdon* Gray, *fimbriata* Gmelin (with vars. *macula* and *cholmondeleyi*) with *irrorata* Gray, which may be a good solution of the problem. Then while *microdon* and *fimbriata* would be classed under *Naria*, the species *macula* and *cholmondeleyi* would not go with them.

Genus EVENARIA.

1930. *Evenaria* Iredale, Mem. Queensland Mus., Vol. x., p. 81, August 28. Orthotype, *Cypraea asellus* Linné.

EVENARIA ASELLUS Linné.

(Plate ix., figs. 5, a, b.)

1758. *Cypraea asellus* Linné, Syst. Nat., xth ed., p. 722, January 1. Third reference is "Rumph. mus. t. 39, fig. M. Asellus." Therefore, though locality is Maldivis, the restricted type locality must be Amboina.

Queensland. New South Wales.

Mr. Melbourne Ward notes: "Mantle, foot and proboscis jet black. Papillae very small, simple, black. Distal portion of tentacles red."

EVENARIA CONTAMINATA Sowerby.

1832. *Cypraea contaminata* Sowerby, Conch. Illus., fig. 21, pt. 4, Oct. 19; Cat., p. 10, November 16, ex Gray MS. No locality. Queensland.

EVENARIA HIRUNDO Linné.

1758. *Cypraea hirundo* Linné, Syst. Nat., xth ed., p. 722, January 1, for Pet. gaz., t. 30, fig. 3, alone. No locality.

1832. *Cypraea neglecta* Sowerby, Conch. Illus., pt. 2, fig. 12, October 5; Cat., p. 6, November 19. Mauritius.

Queensland. New South Wales.

There has been so much confusion that very probably a revision will be necessary when the animals are known. Some of the Australian specimens look like *owenii*, and others differ so much that they may represent another species. The shells will be reviewed later.

EVENARIA KIENERI Hidalgo.

(Plate ix., figs. 3, a, b.)

1906. *Cypraea kieneri* Hidalgo, Mem. Acad. Cien. Madrid, Vol. xxv.; Obras Malac; Mon. *Cypraea*, pp. 139, 177, August; pp. 387, 392, August, 1907. New name for

1837. *Cypraea hirundo* Sowerby, Conch. Illus., pt. 128, fig. 174, September. Not *C. hirundo* Linné, as above.

Queensland. New South Wales.

Mr. Melbourne Ward notes: "Foot pale yellowish white with minute black spots. Mantle transparent white. Papillae white and larger. Tentacles black at base, yellow for the greater part of their length."

EVENARIA PUNCTATA Linné.

1771. *Cypraea punctata* Linné, Mantissa, pt. ii., p. 548. No locality. Queensland.

Linné described this species: "C. testa ovata alba; punctis testaceis; testa vix marginata, magnitudo *C. ziczac*, ore albo."

Hanley (*Ipsa* Linn. Conch., p. 455, 1854), wrote: "Has been usually identified with the pretty little Cowry so designated by Reeve, in his Monograph of that genus (Conch. Icon., Cyp., fig. 101)."

Reeve figured the shell with coloured teeth, stating: "There appear to be two very distinct states of this species, one in which the teeth are yellow and extend partially across the base, represented in the accompanying figure; the other in which the teeth are very fine, short and colourless."

The latter is the true *punctata*, and the Queensland expression has numerous small spots on the back.

Garrett described the animal of "*punctata*" as follows: "The animal is light orange-red, the mantle deeper coloured and profusely sprinkled with white dots; also furnished with pale, dendritic processes. The upper surface of the foot exhibits a few yellowish mottlings. Siphon with a terminal fringe."

This may apply to the next species.

EVENARIA ATOMARIA Gmelin.

(Plate ix., figs. 4, a, b, c.)

1791. *Cypraea atomaria* Gmelin, Syst. Nat., pt. vi., p. 3412, May 14, for Martini, Conch. I., t. 28, figs. 290-291, alone. No locality. Queensland. New South Wales.

Martini's shell has few dark spots and red teeth, and Lamarck's *stercus-muscarum* (Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 98, after Oct., 1810) indicates the same species, "punctis rubiginosis sparsis, rima flavescente." Although *punctata* and *stercus-muscarum* have been regarded as synonymous, it seems better to keep them separate, especially in view of the case of *staphylaea* and *limacina*.

Genus PALMADUSTA.

1930. *Palmadusta* Iredale, Mem. Queensland Mus., Vol. x., p. 81, Aug. 28. Orthotype, *Cypraea clandestina* Linné.

PALMADUSTA CLANDESTINA Linné.

(Plate viii., figs. 2, a, b.)

1767. *Cypraea clandestina* Linné, Syst. Nat., xiith ed., p. 1177. No references nor locality, but good description; collected by J. Zoega; therefore Gmelin (p. 3410) added: "India." Restricted type locality. Ceylon.

Queensland. New South Wales.

Mr. Melbourne Ward writes: "Mantle black. Papillae apparent to the unaided eye; golden near the edge of the mantle, white elsewhere. Foot black, covered with fine white, irregularly shaped spots. Siphon thick and fringed, with long tapering filaments."

PALMADUSTA SAULAE Gaskoin.

1843. *Cypraea saulae* Gaskoin, Proc. Zool. Soc. (Lond.), 1843, p. 23, July. I. Corregidor, Philippine Is., 7 fathoms. Queensland.

One of the first shells Mr. Melbourne Ward sent, before he had begun

painting all the species, was a beautiful little shell with the information: "Pale orange foot and mantle," and it has proved to be the very rare species recorded as *Cypraea saulae* Gaskoin. It resembles Reeve's figure in general features, but is more elongate and graceful, measuring 22 mm. in length, 12 mm. in breadth, and ten in height, pale grey with a pale brown irregular dorsal blotch; the spire is sunken and there are a few brown spots on the sides, and the teeth are white, each with a pale golden line between; the teeth numbering on the inner lip eighteen, and on the outer lip seventeen. Until more specimens are secured this may be named as a subspecies as *Palmadusta saulae nugata* nov.

PALMADUSTA HUMPHREYII Gray.

1825. *Cypraea humphreysii* Gray, Zool. Journ., Vol. i., p. 489, January (corrected in errata). No locality.

Queensland. West Australia. New South Wales.

Other names have been used in connection with this species as *Cypraea lutea* Gronov. (Zoophyl., pl. xix., fig. 17, 1781), species indeterminable; *commixta*, Wood (Suppl. Index Test., p. 9, pl. iii., fig. 11, 1828: Indian Ocean) nothing to do with this; and *nivea* Wood (Suppl. Index, Test., p. 9, pl. iii., fig. 12, 1828: S. Seas), probably a synonym.

From New South Wales the shells are all speckled above with broad white zoning, and are very large and elongated; this form occurs through Queensland (whence I have a note that the animal was vermilion) and also in North West Australia.

From Nickol Bay, North West Australia, there is a series of unspotted (above) shells with two narrow white bands, which have been regarded as the juvenile, but, as many juveniles from the East Coast do not show such features, therefore these are named

PALMADUSTA BIZONATA sp. nov.

These agree with Reeve's pl. xx., fig. 110 c., save that they are unspotted above.

PALMADUSTA ZICZAC Linné.

1758. *Cypraea ziczac* Linné, Syst. Nat., xth ed., p. 722, Jan. 1. Bonan. recr. 3, t. 242. List. Conch. 4, figs. 9, c, 3 t. 1, fig. I. No locality.

Queensland. New South Wales.

There has been confusion with regard to this species, but the few records all belong to the present form; the larger *diluculum* Reeve, has not been recognised yet. The series of small dots around the depressed spire are regarded as diagnostic of the present species, and are retained even in very worn shells.

Genus GRATIADUSTA.

1930. *Gratiadusta* Iredale, Mem. Queensland Mus., Vol. x., p. 82, Aug. 28. Orthotype, *Cypraea pyriformis* Gray.

GRATIADUSTA PYRIFORMIS Gray.

1824. *Cypraea pyriformis* Gray, Zool. Journ., Vol. i., p. 371, October. No locality.

Queensland. North Australia.

Gray later added (Zool. Journ., Vol. iv., p. 77, 1828) "New Holland," but as far as can be determined no such shell could have been received from this locality at this date.

Sowerby (Conch. Illus., pt. 4, fig. 23, Oct. 10, 1832; Catal. p. 7, Nov. 9, 1832), however, gave "Ceylon," which is more likely.

GRATIADUSTA SMITHI Sowerby.

1881. *Cypraea smithi* Sowerby, Proc. Zool. Soc. (Lond.), 1881, p. 638, pl. lvi., fig. 8, Oct. 1. North west coast of Australia. West Australia.

This small shell, like *macula* on the dorsal surface, but with the mouth of the *pyriformis* type, must be kept separate at present, especially as *kaiseri* apparently represents *pyriformis* in the west.

GRATIADUSTA KAISERI Kenyon.

1897. *Cypraea kaiseri* Kenyon, Proc. Linn. Soc. N.S.W., Vol. xxii., p. 145, September 17. Lagrange Bay, Western Australia. Western Australia.

GRATIADUSTA WALKERI Sowerby.

(Plate ix., figs. 2, a, b.)

1832. *Cypraea walkeri* Sowerby, Conch. Illus., pt. 5, fig. 22, October 26; Cat., p. 7, November 9, ex Gray MS. Persian Gulf. Queensland. New South Wales.

A subadult specimen, herewith figured, was dredged off Lindeman Island and the animal figured. Mr. Melbourne Ward describes it thus: "Mantle transparent milk white, papillae few and very short, the tips with very short tassels. Tentacles long, slender, pale yellow, eyes apparent as black dots, proboscis salmon pink. Foot narrow, the tail does not extend beyond the shell when the animal walks."

This very beautiful shell is represented by adult shells also from Lindeman Island, as well as other places on the Queensland coast.

The shell figured has the spire sunken through the elevation of the outer lip above it, and the shell is regularly pyriform; the shell is pale green, profusely speckled with small brown spots, but showing the curious immature banding; this appears to be diagnostic. The two bands of square blotches of dark brown are succeeded by a narrow pale line, and between them the ground colour is brownish; the dead shell shows this pattern more boldly. The teeth on the outer lip are not many and small, about twenty-two, those on the inner lip, large anteriorly, crowded and purple posteriorly, about four large white teeth and seventeen smaller. The shell figured, which may be called *G. w. continens* subsp. nov., measures 29 mm. in length, 17 mm. in breadth, and 15 mm. in height.

GRATIADUSTA XANTHODON Sowerby.

1832. *Cypraea xanthodon* Sowerby, Conch. Illus., pt. 3, fig. 18, October 12; Catal., p. 9, pt. 8, November 16, ex Gray MS. No locality. Queensland. New South Wales.

Our shell does not show the teeth as figured by Sowerby, and has dark spots anteriorly and posteriorly, and grows to a much larger size than the figure.

Genus SOLVADUSTA nov.

Type *Gratiadusta vaticina* Iredale.

The animal figured shows so much distinction from that of *Gratiadusta (walkeri)* that the species must be distinguished, and the teeth are also very different.

SOLVADUSTA VATICINA Iredale.

(Plate viii., figs. 9, a, b.)

1931. *Gratiadusta vaticina* Iredale, Rec. Austr. Mus., Vol. xviii., p. 219, pl. xxiv., figs. 19 (not 11) and 12, June 29. Sydney Harbour, New South Wales.

New South Wales. Queensland.

The Queensland shells agree better with *vaticina* than with *subviridis*, which is narrower and more elongate; Vayssière's *Cypraea subviridis* var. *anceyi* (Journ. de Conch., Vol. liii., p. 15, pl. 1, fig. 45, May 25, 1905) resembles our species.

SOLVADUSTA SUBVIRIDIS Reeve.

1835. *Cypraea subviridis* "Lake" = Reeve, Proc. Zool. Soc. (Lond.), 1835, p. 68, September 2. No locality.
West Australia. North Australia.

Genus MELICERONA.

1930. *Melicerona* Iredale, Mem. Queensland Mus., Vol. x., p. 83, August 28.
Orthotype, *Cypraea listeri* Gray = *melvilli* Hidalgo.

MELICERONA MELVILLI Hidalgo.

1906. *Cypraea melvilli* Hidalgo, Mem. Acad. Cien. Madrid, Vol. xxv.; Obras Malac.; Mon. *Cypraea*, pp. 140, 180, 209, August; pp. 425, August, 1907; new name for *ursellus* Kiener, Spec. gen., Cyp., p. 99, pl. 33, fig. 4, 1845. "L'Océan des grandes Indes" = Amboina.
Queensland. New South Wales.

When I introduced the generic name I used *listeri* Gray, as advised by Schilder, but find that it is scarcely applicable as it was only proposed varietally thus: "*cypraea felina y listeri* Gray (Zool. Journ., Vol. i., p. 384, 1824)," for "Martini," t. 28, figs. 283-284, "from the Maldiv Islands," and the figures are not much like our species. On the other hand, Hidalgo's basis for his *melvilli* is a good representation, but our form is more elongate, and at the Capricorn Group develops a pathological state approaching that seen in the elongation, malformation and melanism of so many New Caledonian shells.

Genus BLASICRURA.

1930. *Blasicrura* Iredale, Mem. Queensland Mus., Vol. x., p. 84, August 28.
Haplotype, *Cypraea rhinoceros* Souverbie.

BLASICRURA RHINOCEROS Souverbie.

1865. *Cypraea rhinoceros* Souverbie, Journ. de Conch., Vol. xiii., p. 156, pl. v., fig. 1, April 1. I. Art, New Caledonia.
Queensland.

A series from North West Isle, Capricorn Group, show great variation in size, some being broad, others narrow, some comparatively large, others comparatively smaller, but the series does not seem separable from the New Caledonian type.

The animal is blackish.

BLASICRURA IRVINEANAE COX.

1890. *Cypraea irvineanae* Cox, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. iv., p. 659, pl. xix., figs. 7-9, February 3. North west coast (error) = Cape Naturaliste, South West Australia.
South West Australia.

BLASICRURA QUADRIMACULATA Gray.

(Plate ix., figs. 6, a, b.)

1824. *Cypraea quadrimaculata* Gray, Zool. Journ., Vol. i., p. 377, October.
No locality.
Queensland. North Australia.

The Australian specimens so determined appear congeneric with

rhinoceros, and it may be noted that for the latter Schilder has used *pallidula* Gaskoin, which was introduced as a varietal name only, thus: "*Cypraea quadrimaculatae* var. *pallidula*" Gaskoin (Proc. Zool. Soc. (Lond.), 1848, p. 97, March 13, 1849), without definite locality. It is pretty certain that Gaskoin's variety did not come from either New Caledonia nor Queensland, so the certain name of Souverbie is here retained.

Shirley would add *interrupta* Gray, but that species again described (Zool. Journ., Vol. i., p. 376, October, 1824) without known locality, has been recognised as the Ceylonese species corresponding to *rhinoceros*, which was the shell intended by the record.

Thiele has recorded from West Australia, *Erronea (Stolida) pallidula* Gaskoin, which apparently would refer to the species named *irvineanae* by Cox.

Genus PALANGEROSA.

1930. *Palangerosa* Iredale, Mem. Queensland Mus., Vol. x., p. 81, August 28. Orthotype, *Cypraea cylindrica* Born.

PALANGEROSA CYLINDRICA BORN.

1780. *Cypraea cylindrica* Born, Test. Mus. Caes., p. 184, pl. viii., fig. 10. No locality.

1870. *Cypraea subcylindrica* Sowerby, Thes. Conch., Vol. iv., p. 9, pl. xxvii., figs. 269-270. Indian Ocean, etc.

Queensland. North and West Australia.

The West Australian shells are more pyriform, with teeth extending on inner lip, and have the end blotches of "*quadrimaculata*" so that they have been mistaken for that species. They have also been called *subcylindrica*, but Sowerby's shell is scarcely separable from the typical form and, moreover, his name is untenable.

Genus ERRONEA.

1863. *Erronea* Troschel, Das Gebiss der Schnecken, Vol. i., p. 205. Logotype, Jousseume, Bull. Soc. Zool. France, Vol. ix., p. 94, July, 1884. *Cypraea erronea* Linné.

[ERRONEA ERRONES Linné.

1758. *Cypraea erronea* Linné, Syst. Nat., xth ed., p. 723, January 1. No references or locality.

The determination of the shell apparently erroneously so called is difficult. Linné's species is shortly described as "*C. testa umbilicata: macula testacea aequali*," an absolutely inadequate definition.

Hanley (*Ipsa*. Linn. Conch., p. 191, 1854) has determined it as equalling *olivacea* Lam., and states that Linné's son had added "*Martini, 278-279*," which is the species with red teeth, named *C. ovum* by Gmelin (Syst. Nat., pt. vi., p. 3,412, 1791).

The common Australian shell has a wide mouth, subcylindrical shell, rather coarse weak teeth and a pallid base, without any red on the teeth at all. It is here below described as an unnamed species in order to clarify the situation.]

ERRONEA CHRYSOSTOMA Brazier.

(Plate viii., figs. 8, a, b.)

1881. *Cypraea chrysostoma* Brazier, Proc. Linn. Soc. N.S.W., Vol. v., p. 445, February. As synonym of

1875. *Cypraea sophiae* Brazier, Proc. Linn. Soc. N.S.W., Vol. 1, p. 7, April 27. San Christoval Island, Solomon Archipelago. Queensland.

Apparently this very distinct form is near the true *errones* = *ovum* = *olivacea*, and it is easily recognisable by its shape and apertural characters. The figures of the shell are drawn from a Queensland example, and Mr. Melbourne Ward's figure shows an animal similar to that he also figured of the so-called *errones*. Unfortunately the association of the shell and animal in this case was not quite clear, but is given to assist. Quoy and Gaimard described the animal of *olivacea* from Port Dorey, New Guinea: "Small species in which the animal has the mouth and the tentacles yellow orpin, the mantle greenish with some black spots; it is covered with fairly long bifid whitish filaments. The foot is very finely spotted with black on its sides and yellowish below."

The species, *chrysostoma*, has been found abundantly at Morove Lagoon, one of the Solomons, and with it, very rare but typical and distinct, the next species.

ERRONEA NIMISERRANS sp. nov.

(Plate ix., figs. 1, a, b.)

This common shell shows much variation in size and depth of coloration, so that probably many subspecies may be hereafter distinguished. The juveniles also appear to differ.

Mrs. Coxen has published a description of the animal: "Foot yellowish cream colour, the upper part finely mottled all over with black markings; small lobe under the respiratory canal marked with fine dark lines; tentacles blackish-brown; around the trunk a light brown fringe."

The figured shell measures 28 mm. in length, 15 mm. in breadth and 13 mm. in height, coloration greenish mottled with darker and a dark band across the back; the base yellowish, the teeth weak and few, the mouth open, especially towards the anterior canal, a diagnostic feature. The Queensland shells vary in size and depth of coloration and the presence of a dark spot on the back, but are comparatively uniform.

Queensland. New South Wales. West and North Australia.

ERRONEA COXI Brazier.

1872. *Cypraea coxi* Brazier, Proc. Zool. Soc. (Lond.), 1872, p. 617, pl. xlv., figs. 3, 3a, November 3. Dupuch's Is., N.W.A. West Australia.

ERRONEA CAURICA Linné.

1758. *Cypraea caurica* Linné, Syst. Nat., xth ed., p. 723, January 1. No references or locality.

Queensland. New South Wales. North and West Australia.

The original description reads: "C. testa margine gibbo inaequali albido fusco-punctato, dorso nebulato-testaceo," and the common shell so described is very variable in form.

Melville has named *Cypraea caurica* var. *oblongata* (Mem. Proc. Manch. Lit. Soc., Ser. ix., Vol. i., p. 217, pl. 1, fig. 8, June, 1888) from "East Indies, general," and our shell has been so named, but it is even more elongate and apparently never becomes gibbous marginad. As many shells are available from many localities, the Australian shell is named *Erronea caurica longior* subsp. nov., being more cylindrical and narrower than Melville's variety. The measurements of a large specimen read: Length, 52 mm.; breadth, 25 mm.; height, 19 mm.; the coloration is pale green, speckled all

over with darker green, the juvenile banding showing somewhat obscurely; the sides not expanded and the spotting on the sides rather dull.

Western Australian shells appear to be comparatively broader.

Genus OVATIPSA.

1931. *Ovatipsa* Iredale. Rec. Austr. Mus., Vol. xviii., p. 219, June 29. Orthotype, *Cypraea chinensis* Gmelin.

OVATIPSA CHINENSIS Gmelin.

1791. *Cypraea chinensis* Gmelin, Syst. Nat., pt. vi., p. 3,421, May 14; for Argenv. Conch., t. 18, fig. Z. China.
- [1791. *Cypraea cruenta* Gmelin, Syst. Nat., pt. vi., p. 3,420, May 14, for Gualt. test., t. 15, fig. E. No locality. Indeterminate.]
1798. *Cypraea crenata* Bolten, Mus. Bolten, pt. ii., p. 23, September, for Mart. i., t. 29, fig. 303. No locality.
1798. *Cypraea morbillosa* Bolten, Mus. Bolten, pt. ii., p. 27, September, for same figures.
1810. *Cypraea variolaria* Lamarck, Ann. Mus. Hist. Nat. Paris, Vol. xvi., p. 91, after October; Hist. Anim. s. Vert., Vol. vii., p. 387, August, 1822. Indian Ocean = Amboina.
1931. *Erronea (Ovatipsa) chinensis* Iredale, Rec. Austr. Mus., Vol. xviii., p. 219, pl. xxiv., figs. 11 (not 19) and 20, June 29. Sydney Harbour, N.S.W.

New South Wales. Queensland.

Under the name "*Cypraea variolaria*" Quoy and Gaimard have described and figured a specimen from Dorey, New Guinea: "The mantle of this species is of a red flesh colour. It shows tubercles, a little elongated, simple and white, and these extend further on the left than on the right side. The tentacles and siphon are also of this flesh colour; the latter is ciliated. The proboscis is of sealing wax red. The foot is of a clear rose on the side with reddish spots. It is peculiar in being truncated behind, not attaining the extremity of the mouth. As we only had one individual, we cannot say whether this is a constant feature. We present a drawing of the quadrilateral form of the foot."

This description of the animal indicates the distinction of the group founded upon shell characters, and separates it rather widely from the genus *Erronea* as far as the superficies of the animal is concerned. It is curious that specimens should be found in Sydney Harbour before the species had been received from Queensland, and it had been recorded from New South Wales many years ago. The Sydney shells are more truly oval than usual, but there seems to be little doubt as to their relationship, but better material is necessary before suggesting separation.

Shirley has recorded "*cruenta* Gmel." from Torres Straits, but in that same lot he added *annulata*, *testudinaria*, *ventriculus* and *pantherina*, all island shells, none of which occur in Australian waters; so probably his "*cruenta*" was also not a local shell.

Genus IPSERRONEA NOV.

Type *I. problematica* nov.

A beautiful animal was collected at Lindeman Island and the painting made by Mr. Melbourne Ward, but upon death the shell was found to be immature. However, this immature shell appears to be as distinct as the animal, so it is here named for future recognition.

Animal very large, apparently related to that of *Erronea*. Mr. Melbourne Ward noted: "Papillae single and branched. Proboscis reddish brown. Siphon short, fringed with yellow papillae. Tentacles long, slender, pale reddish brown."

IPSERRONEA PROBLEMATICA SP. NOV.

(Plate ix., figs. 8, a, b.)

Shell immature. Spire planate, apical whorls of three or four, dark brown, becoming buried by the advancement of the adult shell, which is ovate in formation; the coloration is pale bluish, showing five bands of brownish, a feature separating it from all other known Australian species. The columella has a longer slender twist, again unlike any species otherwise recalling it. The specimen measures: Length, 21 mm.; breadth, 12 mm.; height, 10 mm.

Subfamily AUSTROCYPRAEINAE.

This subfamily contains all the recent and fossil small Cypraeid shells from Southern Australia, and these will provide much study in the future. There appears to be many more species than have been allowed until quite recently, and it will be interesting to work out their fossil ancestors.

Beddome as long ago as 1898 admitted four species with three varieties from Tasmania. These May reduced to one species with three varieties in 1921. Schilder in 1927 allowed four species from Tasmania, and one from West Australia, forming a subgenus for the former, and placing the latter in the genus *Austrocypraea*, proposed for a Victorian fossil. Cotton and Godfrey in 1932 arranged the South Australian shells under eight species, and this seems nearest the truth. With fairly good series, there can easily be admitted four outstanding groups, which cannot be confused, and another three or four which are possibly just as separable when a larger number of shells are available.

The only notes on the animals are those given by Angas, who wrote: "The animal of *C. comptoni* is of a bright orange-colour, whilst that of *C. bicolor* of Gaskoin is of a pale lemon." This has been confirmed by Cotton and Godfrey for the same two species, but these workers do not mention the animal-coloration of any of the other local species.

Genus AUSTROCYPRAEA.

1903. *Austrocypraea*. Cossmann, Essais Paleoonch. comp., livr. 5, p. 164, December. Orthotype, *Cypraea contusa* McCoy.
 1927. *Prolyncina* Schilder, Arch. für Naturg. (Wiegmann), 91st Year, Abt. A, heft 10, p. 94. Orthotype, *Cypraea reevei* Sowerby.

AUSTROCYPRAEA REEVEI Sowerby.

1832. *Cypraea reevei* Sowerby, Conch. Illus., pt. 8, fig. 52, November 16; Catal., p. 2, pt. 7, November 9, ex Gray MS. Garden Island, Swan River, West Australia.

West Australia. South Australia.

In all essential features the recent species agrees with the fossil, the number of teeth being the only notable distinction. This cannot be regarded as of more than subgeneric value, even if that be allowed. The recent shell has been dredged from deep water in the Great Australian Bight, and the specimens cannot be separated save by their more delicate texture and more notable contusion.

GENUS NOTOCYPRAEA.

1927. *Notocypraea* Schilder, Arch. für Naturg. (Wiegmann), 91st Year, Abt. A, heft 10, p. 110. Orthotype, *Cypraea piperita* Gray.

Schilder introduced this genus for the southern forms admitting four species, *piperita* Gray, *comptoni* Gray, *subcarnea* Bedd (= *angustata* Gray) and *declivis* Sow., all ranging from South West Australia to Tasmania. *C. pulicaria* Reeve, with a range of "Perth to Adelaide," he placed under *Austrocypraea* Cossm., whose type is the fossil, *contusa* McCoy. To the latter belongs *C. reevei* Sowerby, but with this and *pulicaria* there is no affinity, while Verco went so far as to deny the specific distinction of *pulicaria* from *piperita*, so that the relationship of these two latter seems certain. The columellar features, however, clearly separate these groups, the deep fossa and lower projection contrasting with the rather receding columella with obsolete fossa.

NOTOCYPRAEA PIPERITA Gray.

1825. *Cypraea piperita* Gray, Zool. Journ., Vol. i., p. 498, January, ex Solander MS. New Holland. Restricted type locality. South Australia.
Tasmania. Victoria. South Australia. West Australia.

The determination of the true "*piperita*" appears to depend on the "four, narrow, sometimes slightly interrupted bands," the cylindrical shape and the columellar formation. It must be obvious that Gray confused the South Australian species with some tropical one bearing Solander's MS. name as certainly Solander never saw a South Australian Cowry. It is probable that Gray's specimens were brought back by Flinders, who examined the South Australian coast, and was interested in shell-collecting.

NOTOCYPRAEA DISSECTA Iredale.

1931. *Notocypraea (piperita) dissecta* Iredale, Rec. Austr. Mus., Vol. xviii., p. 220, pl. xxiv., figs. 7, 8, June 29. Twofold Bay, New South Wales, 45 fathoms.
New South Wales.

NOTOCYPRAEA BICOLOR Gaskoin.

1849. *Cypraea bicolor* Gaskoin, Proc. Zool. Soc. (Lond.), 1848, p. 92, March 13, 1849. Australia.
Victoria. Tasmania. South Australia.

"Differs from the *Cyp. piperita* in not being cylindrical, but of a pyriform shape; in being very gibbous, and a much heavier and thicker shell; in having only three bands, which are very broad and conspicuous. Long, 90/100ths.; high, 55/100ths.; wide, 55/100ths. of an inch."

I regarded this description as referable to *angustata* auct., the words "very gibbous" suggesting that species, but the measurements deny the association, and the name seems better applicable to the form called *mayi* by Beddome and known as *bicolor* in Victoria.

NOTOCYPRAEA DECLIVIS Sowerby.

1870. *Cypraea declivis* Sowerby, Thes. Conch., Vol. iv., p. 31, fig. 287, 328, 329. Tasmania.
Tasmania. Victoria. South Australia. New South Wales. West Australia.

This distinct species is easily recognised by the pale coloration, spotting on the back, and lack of banding so noticeable in some of the other species

of the same shape. The West Australian shells from Geographe Bay are all more slender and may be regarded as a subspecies under the name *N. declivis occidentalis* nov. It has sometimes been suggested that on account of the spotting this might be the true *piperita*, but the description does not agree, and this is the more uncommon shell, the spots being only on the sides of the shell in *piperita* according to the description.

Beddome's *subcarnea*, according to his specimens, appears to be a colour aberration, through illness, of this species, while *albata* appears also to be founded on albino specimens of any of the species.

NOTOCYPRAEA EMBLEMA Iredale.

1931. *Notocypraea (bicolor) emblema* Iredale, Rec. Austr. Mus., Vol xviii., p. 220, pl. xxiv., figs. 3, 4, June 29. Off Cape Everard Bank, Bass Straits, 70-90 fathoms.
South East Australia (deep water).

In describing this beautiful shell I used the specific name "*bicolor*" to replace the very erroneous *angustata*, but now regard "*bicolor*" as more applicable to a narrower shell, and Cotton and Godfrey have named the South Australian broad shell, *verconis*. I now allow the deep water shells above referred to specific rank.

NOTOCYPRAEA VERCONIS Cotton and Godfrey.

1932. *Notocypraea verconis* Cotton and Godfrey, South Austr. Naturalist, Vol. xiii., p. 41, pl. 1, fig. 8, "February" = April 15; Gulf St. Vincent, South Australia.
South Australia. Victoria. Tasmania. Southern New South Wales.
This is the species regarded as typical *angustata* by Beddome.

[NOTOCYPRAEA COMPTONII Gray.

1847. *Cypraea comptonii* Gray, Narr. Survey. Voy. "Fly" (Jukes), Vol. ii., p. 356, pl. 1, fig. 3. Port Essington.

Although this has been regarded as an erroneous locality and the name used for a Southern Australian shell, the data at present seem irreconcilable. The figure does not agree well with the southern shells so named, and the description is also unconvincing. Moreover, the southern shells so named appear to have a very doubtful specific identity, the majority of the specimens available being colour variations of other species. Although Angas recorded the animal coloration as differing the shell so-called *comptonii* by Angas is not recognisable. The probable elimination of this name is suggested, and the real *comptonii* may be a form of *walkeri*.]

GENUS GUTTACYPRAEA NOV.

Type, *Cypraea pulicaria* Reeve.

The cylindrical form, the pale coloration and especially the columellar features deserve separation at present, but the future of this species is not yet finally settled.

GUTTACYPRAEA PULICARIA Reeve.

1846. *Cypraea pulicaria* Reeve, Conch. Icon., Vol. iii., pl. xvii., fig. and sp. 84, January. No locality. = West Australia.
West Australia.

Apparently this species is restricted to South West Australia, where, however, it appears to be abundant and constant.

Genus THELXINOVUM.

1931. *Thelxinovum* Iredale, Rec. Austr. Mus., Vol. xviii., p. 220, June 29.
Orthotype, *T. mollerii* Iredale.

This group was distinguished on account of the elevated spire, the other species of this subfamily having planate spires.

THELXINOVUM MOLLERI Iredale.

1931. *Thelxinovum mollerii* Iredale, Rec. Austr. Mus., Vol. xviii., p. 220, pl. xxiv., figs. 17, 18, June 29. Off Twofold Bay, New South Wales, 45 fathoms.
New South Wales.

NOTE: All the specimens here figured were collected on Lindeman Island, Queensland, by Mr. Melbourne Ward.

EXPLANATION OF PLATE VIII.

- Figs. 1, a. Animal and shell of *Arabica arabica* Linné.
 ,, 2, a, b. Animal and shell of *Palmadusta clandestina* Linné.
 ,, 3, a, b, c. Animal and shell of *Procalpurnus lacteus* Lamarck.
 ,, 4, a, b. Animal and shell of *Calpurnus verrucosus* Linné.
 ,, 5, a, b. Animal and shell of *Mystaponda vitellus* Linné.
 ,, 6, a, b. Animal and shell of *Purperosa facifer* Iredale.
 ,, 7, a, b. Animal and shell of *Erosaria erosa* Linné.
 ,, 8, a, b. Animal (?) and shell of *Erronea chrysostoma* Brazier.
 ,, 9, a, b. Animal and shell of *Solvadusta vaticina* Iredale.
 ,, 10, a, b. Animal and shell of *Lyncina vanelli* Linné.

EXPLANATION OF PLATE IX.

- Figs. 1, a, b. Animal and shell of *Erronea nimiserrans* Iredale.
 ,, 2, a, b. Animal and shell of *Gratiadusta walkeri* Sowerby.
 ,, 3, a, b. Animal and shell of *Evenaria kieneri* Hidalgo.
 ,, 4, a, b, c. Animal and shell of *Evenaria atomaria* Gmelin.
 ,, 5, a, b. Animal and shell of *Evenaria asellus* Linné.
 ,, 6, a, b. Animal and shell of *Blasicrura quadrimaculata* Gray.
 ,, 7, a, b. Animal and shell of *Paulonaria macula* Angas.
 ,, 8, a, b. Animal and shell of *Ipserronea problematica* Iredale.
 ,, 9, a, b. Animal and shell of *Derstolida fluctuans* Iredale.
 ,, 10, a, b. Animal and shell of *Monetaria annulus* Linné.